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AMERICAN JOURNAL OF OPHTHALMOLOGY

VOLUME 26 JUNE, 1943 NUMBER 6

MOLLUSCUM CONTAGIOSUM OF THE EYE, ITS CLINICAL COURSE AND TRANSMISSIBILITY, AND THE CULTIVABILITY OF THE VIRUS*

LOUIS A. JULIANELLE, PH.D., AND WILLIAM M. JAMES, M.D.
Saint Louis

While molluscum contagiosum has long been recognized and adequately described as a cutaneous manifestation, its ophthalmologic counterpart has received but scant attention. It is referred to in passing in the textbooks (Fuchs, May, Berens, and others), and Duke-Elder,[1] for example, describes the essential lesion as "a small rounded tumor, the surface of which is somewhat flattened and has an umbilicated depression in its center. From this a substance resembling sebum is discharged on pressure. This form of molluscum is contagious." In the light of such fragmentary information, it appeared desirable to place on record five examples of the condition, primarily observed by one of the writers (W. M. J.). As the patients appeared in succession, it became obvious that the opportunity was presenting itself for an experimental study on both the transmissibility of the infection to animals as well as the cultivability of the infectious agent. It is proposed to give in this report a description of the clinical disease and a summary outline of the experiments thus far undertaken.

CLINICAL

The first patient seen made the greatest impression of all in the group and it may, therefore, be of interest to describe the condition in detail. It was particularly severe in character, and the diagnosis was established after a period of six months' observation. The patient was a boy, aged 10 years, who had been referred for consultation six months after the onset of a mild conjunctivitis of the left eye. During this period there had been a loss of vision, moderate disability, and the appearance of "phlyctenular keratitis" had been recorded. That the condition had troubled both the pediatrician and ophthalmologist in charge is readily realized from the numerous tests already performed. These included Kline and Kahn tests, agglutinations for tularemia and brucellosis, Mantoux and patch tests for tuberculosis, all of which had been negative, and a number of skin inoculations to detect an allergic state. Among the latter, reactions of two-plus intensity were elicited to bean, cheese, goose feathers, dog hair, kapok, and orris; other reagins were without effect. At first, responding satisfactorily to neosilvol, the eye nevertheless remained red and irritable. A tonsillectomy was performed three months after the original symptoms appeared, but the eye became more inflamed, the upper lid developing a definite ptosis. At this time a diagnosis of chronic iritis was suggested by a second oculist called into consultation.

It was at this stage that the patient was first seen by one of us (W. M. J.). Ex-

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amination revealed the right eye to be normal. In the left eye, vision had been reduced to 20/40, and photophobia and lacrimination were marked. The upper lid was thickened, and drooped over the upper third of the cornea. There was a small mass, about 1 mm. in size, on the marginal surface of the upper lid at the junction of its outer and middle thirds, and a small amount of white waxy material was present centrally in the mass.

The true condition escaped diagnosis until conference with Dr. Harvey Lamb, at that time pathologist in this department. Acting upon his advice, the lid tumor was removed for study. After sectioning and staining with hematoxylin and eosin, the inclusion bodies typical of molluscum contagiosum were promptly encountered. The local use of atropine was discontinued and irrigation with sodium biborate was substituted. Within

TABLE 1

CLINICAL DATA FROM FIVE CASES OF MOLLUSCUM CONTAGIOSUM

Case Number	Age	Location of Lesion	Duration	Symptoms	Conjunctiva	Cornea
1. R. M.	10	Margin left upper lid	6 months	Pain Photophobia Tearing Ptosis	Follicular conjunctivitis, marked	Pannus, Subepithelial infiltration, Erosions
2. E. L.	39	Cutaneous surface, right lower lid	3 weeks	Burning Tearing	Slight hyperemia	Normal
3. R. M.	30	Margin right lower lid	4 weeks	Tearing Photophobia	Follicular reaction, mild	Ciliary injection and single infiltration at 8-o'clock position
4. W. M. D.	33	Margin left lower lid	3 weeks	Mass Tearing Burning	Mild conjunctivitis	Ciliary injection with faint subepithelial infiltration
5. L. M. Wrestler	17	Generalized cutaneous surface of body	4 weeks	Eyestrain	Mild conjunctivitis	Normal

In general appearance it resembled a small marginal chalazion with macerated center. The conjunctiva was granular, beefy, and markedly thickened. The cornea in its upper third was infiltrated and invaded by a superficial pannus. Several areas of small diffuse infiltrations and pinpoint erosions of the epithelium were present. The aqueous was hazy; the iris was widely dilated with atropine; the posterior segment appeared to be normal. Interestingly enough, the general appearance of the eye was not unlike that seen in acute trachoma, advanced to the stage of pannus, corneal infiltration, and minute ulcers.

a week the degree of improvement was highly gratifying; within a month ptosis had disappeared, the conjunctiva had become pale, the cornea recovered its original transparency, and vision returned to normal. Recovery must be considered as complete, for there has been no recurrence of the infection.

In this case the condition had been present for six months. The corneal involvement was more marked than that seen in subsequent patients.

During the four years intervening, four additional patients who had molluscum contagiosum of the eye have been studied by the writers. The detailed de-

scription of the foregoing case precludes the need for similar elaboration of the later individuals, so that their cases may be presented somewhat briefly (see table 1). In each instance, the condition first appeared as a more or less benign mass in the lid margin, but within two weeks to a month, each patient sought medical attention. Monocular in all cases, the infection was nevertheless generalized, numerous cutaneous lesions being present in one patient, a wrestler on the University squad. In this group of four cases the infection had been present from three to four weeks. In two, a mild keratitis was present, characterized by marginal subepithelial infiltration and ciliary injections. In two cases, there was also a mild conjunctivitis. It is probable that the infection originates in the sebaceous glands, since histologic study reveals a proliferation of the walls about the ducts with keratinization of the more centrally located cells. The individual nodule may vary in size from a pin-point to a small pea. The characteristic features of the nodule are the waxy contents, central umbilication, and their location along the lid margin. When the umbilications are very small they are discovered with difficulty, so that the nodules may be erroneously taken for milia. Chronic conjunctivitis is apparently a common symptom and was present in all five cases. Corneal complications are not so regular a phase of the infection, perhaps reflecting the virulence of the virus involved or the duration of the infection. At any rate, the infections had involved the cornea in three of the five cases, appearing in each as a superficial keratitis. It may be of interest in this connection to cite similar observations by Gifford and Gifford,[2] who reported conjunctivitis in six patients and keratitis in only one associated with molluscum contagiosum. In 1942, Cowan[3] reported two cases with corneal complications.

Perhaps the most striking feature of the disease is the occurrence of epithelial-cell inclusions, so that diagnosis can be verified pathologically. In sections, the cell containing the inclusion is immensely enlarged, the nucleus is but a remnant of its original self and is usually pushed compactly against the cell wall; the cytoplasm will be seen to contain the inclusion appearing as multiple sacs staining intensely and heterogeneously. The "molluscum bodies" resemble so closely those found in fowl pox that several attempts have been made in the past to identify both manifestations as one disease. That a visual impression of molluscum contagiosum may be had microphotographs of the human sections are shown in plate 1.

Molluscum contagiosum of the eye responds promptly and satisfactorily to proper treatment. Resection of the growth followed by mild irrigation is sufficient therapy. If the nodules are completely removed, healing sets in immediately and no recurrence nor exacerbations are encountered. Failure to remove the infected cells on the other hand not only prevents recovery but allows the virus to spread into the adjacent cells of both conjunctiva and cornea.

Experimental

Long before viruses were ever recognized, the large hyaline structure, now identified as the inclusion body of molluscum contagiosum, was described almost simultaneously by Henderson[4] and Paterson[5] in 1841. Somewhat later, attempts to transfer the cutaneous condition from man to man were followed with successful transmission by several investigators.[6–11] The period of incubation succeeding the inoculation ranged from a minimum of 14 days[11] to a maximum of six months[8] with, however, considerable intermediate variation. In spite of the earlier diverse opinions regarding the na-

Plate 1. See next page for legend.

ture of the infectious agent, it was subsequently demonstrated to be filterable through Chamberland[9] and Berkefeld[10,11] candles. Injections of inclusion-bearing tissues, however, failed to elicit any reaction in monkeys[12] or smaller animals,[12,13] thus suggesting a high specialization on the part of the virus both regarding species-specificity (that is, man) and tissue specificity (that is, epithelium). It is to be noted, however, that all of the experiments cited were undertaken with tissue from the generalized skin lesions, and not from those on the conjunctiva. From the ophthalmologic point of view, therefore, it was of interest to determine both the transmissibility of the disease in animals and, at the same time, its propagation under artificial conditions. Four complete experiments have now been finished, and it is desirable to record the observations made.

Methods. Material for study was obtained by excising the lesion on the lid margin with a small scalpel. The material was immersed in sterile veal-infusion broth, and subsequently macerated into a fine emulsion by grinding in a mortar with a pestle. The emulsion was then seeded on bacteriologic media, and inoculated into monkeys, rabbits, and mice. In the two former animals, inoculations were made conjunctivally both by scarification and instillation, and by injection (0.2 c.c.). In the mice, on the other hand, injections were made intraperitoneally and intracerebrally. In addition, inoculations were made in the usual manner on the chorioallantois of fertile hen eggs, using for the purpose 10-day-old embryos. Two drops of the emulsion were discharged on the membrane from a 1.0-c.c. pipette.

Observations. The bacteriologic cultures made of the ground tissues were sterile in three of the experiments. In the fourth, a scant growth of Staphylococcus albus was obtained, and this was discarded as an obvious contaminant, because its presence in the material studied had no appreciable effect either in the animal or in the egg culture.

The inoculations in monkeys were followed by no visible clinical effect. The animals were examined once a week over a period of six weeks, when the experiments were terminated as unsuccessful transmissions. In one experiment only, small slips of conjunctiva were excised for sectioning and staining, and in this instance the tissues were normal in every way and no inclusion bodies were found. It was concluded, therefore, that molluscum contagiosum is not transferrable to monkeys, thus confirming the observation reported earlier by Goodpasture and Woodruff working with cutaneous material.[12]

Similarly, the inoculations in rabbits induced no apparent reaction, and the material was tolerated from the very beginning without inflammation or hyperplasia. The mice injected intraperitoneally were killed after 10 days or after three weeks, even though they appeared in normal condition at the time. No evidence was found of the survival of the virus. The mice receiving material intracerebrally were killed at the end of three weeks, when sections were made of the inoculated area of the brain. Stained preparations revealed an essentially nor-

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Plate 1 (Julianelle and James). Molluscum contagiosum of the eye. 1, Note nodule in margin of lower lid. 2, Section through nodule (low power). 3, Section through nodule (high power). Note inclusion bodies. 4, Section through chick membrane (low power). Note projections of epithelium and epithelial pearls. 5, Section through chick membrane (high power). Note enlargement of cells. 6, Section through chick membrane (oil immersion). Note inclusion bodies.

mal tissue without indication of the cytoplastic structures of the disease. The indications are, therefore, that, as in the case of the monkey, molluscum contagiosum cannot be implanted in smaller animals. The observations on transmission accordingly corroborate the highly specialized species-specificity of the molluscum virus.

Somewhat different results were encountered in the experiments conducted for propagation on egg embryos. In two cases of inoculation, the embryos remained completely unaffected by the inoculation. Examinations were made at five and eight days after seeding; at this time development of the young chicks was normal and the chorioallantois did not reveal even the original site of implantation.

In two other experiments, on the other hand, there was unmistakable evidence of propagation as the accompanying photomicrographs will illustrate (plate 1). At the site of inoculation, for example, there was grossly extensive thickening and marked rigidity of the chorioallantoic membrane. On the other hand, there were no vesicular excresences, such as are so frequently seen after inoculating a number of viruses. Stained sections revealed an increase of five-fold or more of the original membrane. The epithelial cells had undergone marked hyperplasia, so that a number of strata had been added, and there were distant digital projections of the epithelium pushing into the mesoderm. Practically all of the epithelial cells in the involved area were strikingly enlarged, and what was left of the nucleus appeared as a thin pyknotic segment crowded against the cell membrane. The ballooned cytoplasm was filled compactly with the large hyaline bodies, typical of molluscum inclusions. Proliferation of the mesoderm was even more extensive than that of the epithelial tissue. A notable change was the appearance of numerous epithelial pearls arranged indiscriminately throughout the entire layer. In contradistinction to the epithelial cells of the chorioallantoic membrane, the epithelial cells comprising the pearl did not give evidence of inclusion bodies. That the general reaction of the propagation had been irritating to the chorioallantois was evidenced by accumulation of cells here and there, composed for the most part of polymorphonuclear leucocytes.

Summarizing the experimental evidence, it is seen that molluscum contagiosum of the eye was not transferred to monkey, rabbit, or white mouse. Implantation in the hen egg, however, was followed in two of four experiments by infection of the chorioallantoic membrane, multiplication of the virus, and the appearance of typical inclusion bodies.

In conclusion, therefore, it may be said that molluscum contagiosum of the eye is an uncommon condition of the eyelids, characterized by persistent conjunctivitis, sometimes complicated by an associated keratitis. The clinical appearance may be deceiving because of its similarity to marginal chalazia, milia, and warts. Diagnosis by histologic examination is infallible, and may be readily accomplished, since all nodules should be removed in any case as the logical and successful means of treatment. Molluscum contagiosum differs from most virus diseases, in that the degree of infectivity is low. The observations that readily support this statement are (1) the process remains monocular; (2) the infection does not spread readily to members of the family; (3) even the intimate contact provided by wrestling does not cause dissemination of molluscum contagiosum among members of the same squad; and (4) the infectious agent or virus has been propagated on chorioallantoic egg membrane in two of four attempts.

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A NEW CROSS-CYLINDER TEST FOR ASTIGMATIC AXIS, WITHOUT USE OF TEST TYPE*

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There may be room for argument as to the exact principles on which glasses shall be prescribed after the refraction has been measured. But no one can consider himself an expert or well-qualified refractionist whose knowledge and training do not enable him to measure the patient's entire refractive error, hyperopic, myopic, or astigmatic. After the full error has been measured so far as the structure of the individual eye will permit, the examiner may presume to make such deductions as his understanding suggests. Some, for the patient's convenience and their own, will undercorrect the hyperopic error, especially as found under cycloplegia. Some will feel it safer to undercorrect high myopic errors. Some will even for various reasons give less than the whole astigmatic correction recorded. But in every case the full error should be placed on record.

Most medical refractionists know how to measure the full spherical myopic error, and how to avoid overstatement of such error. With the aid of cycloplegia, at least, the majority can be relied upon fairly well to ascertain the full spherical hyperopia. But it may be doubted whether more than a substantial minority have learned to avail themselves to the full, and in every case, of the existing means for accurately recording the amount and axis of the astigmatic error.

Retinoscopy under cycloplegia appears to be the main stand-by of many who regard themselves as scientific refractionists. Some workers do little or no precycloplegic testing of refraction, and then, after retinoscopy under cycloplegia, devote very little time to subjective testing at the trial case.

It is true that retinoscopy is capable of playing a most useful part, that in the very young and in some other patients it may have to be the sole basis of record, and that it is often a decided time-saver as a preliminary to subjective testing. But as to sharp details of correction it should seldom be accepted as final. The "court of last resort," wherever practicable, should always be the subjective

* Read at the seventy-eighth annual meeting of the American Ophthalmological Society, at Hot Springs, Virginia, June 1-3, 1942.

trial-case test, pursued to the exclusion of even fractional doubt so far as is possible.

It has been shown repeatedly that in most cases the spherical and cylindrical variations in different parts of the undilated pupil introduce an element of uncertainty as to the reliability of the retinoscopic findings. Thus Stine (American Journal of Ophthalmology, 1930, volume 13, page 101) found that the vast majority of eyes showed considerable variation of refraction as between the visual and extravisual zones of the pupil; and that this difference varied in different individuals, in the two eyes of the same individual, and in the quadrants of the same eye. He called attention to the fact that negative aberration and the marked asymmetry of mixed aberration were met with in more than 40 percent of the children examined.

Through the undilated pupil, not only is retinoscopic measurement more difficult but it is also rendered unreliable by the presence of accommodation.

Since astigmatism is present in most of our patients, it is desirable for the conscientious refractionist to be thoroughly acquainted with the refined use of several subjective techniques for exact measurement of astigmatism. Unfortunately, as to the presence or amount of astigmatism too many workers rely upon the mere placing of simple plus and minus cylinders before the patient's eye, while he looks at the letter chart; though this practice, as it seems to me, offers very little possibility of scientific accuracy. In checking the astigmatic axis, too many still limit their efforts to simple rotation of the astigmatic lens to different positions in the trial frame. It may be admitted that these methods are not always without value, but they are inadequate in the great majority of cases.

It is not proposed here to discuss in detail all the special methods which have been suggested for measuring astigmatism. Some, like velonoskiascopy, although based upon scientific principles and capable of yielding refined results, are less quickly and less conveniently applicable than other methods, such as the intelligent use of astigmatic dials and cross cylinders.

In admitting that every method may at times fall short of complete accuracy, and especially of that sort of accuracy which gives the patient the maximum of comfort, it is necessary to remember that the eye is never a perfect optical instrument, and that many eyes are very far from being perfect optical instruments. The degree of optical accuracy present in the average human eye is a subject for wonder and admiration, but the spherical and astigmatic aberrations must always be kept in mind if we would understand the difficulties that confront us. If the refractive measurement varies in different parts of the same pupillary area, and if the refractive measurements used by the eye and brain may vary from time to time in the same eye, even with the pupil undilated, the refractionist, however careful he may be, should be prepared to distrust the finality of his own examinations and prescriptions.

In some straightforward cases irregular astigmatism seems to play an entirely insignificant part, and any good method will yield a satisfactory measurement of the astigmatism. In other cases it becomes necessary to check one method by another, or even to abandon one method completely in favor of another which gives radically different results.

I worked for some years with the astigmatic dials before learning to use the cross-cylinder tests. I have repeatedly called attention to the fact that there is a small proportion of our refraction cases in which the astigmatic dials are unreli-

able and the cross cylinder much more reliable in testing for the amount of astigmatic error; while, on the other hand, there is an important minority of patients in whom the cross-cylinder findings prove misleading and ineffective and in whom the astigmatic dials are much more accurate and reliable.

In some patients the old clock-dial or wagon-wheel astigmatic chart gives quick and approximately accurate results as to the axis and amount of the astigmatic error. By the use of a little ingenuity, the wagon-wheel dial may often be made to give a fair amount of refinement as to the axis. But everyone who uses these dials has had cases in which it was impossible to obtain a clear selection of the maximum and minimum meridians of refraction, and such experiences make us welcome the cross cylinder with its greater independence of the vagaries created by irregular astigmatism.

After talking so much in favor of the cross-cylinder test with letters, I may occasion some surprise by offering a new combination test that is intended to serve as a check on the accuracy of the cross-cylinder test for axis. But, even with the cross-cylinder test, irregularly constructed eyes occasionally give provokingly variable and contradictory results.

In such instances, all who use the cross-cylinder test for axis are disposed at times to suspect that a part of the patient's difficulty lies in attention to the varying shapes of the letters, with occasional emphasis on oblique lines. Beach's use of the letters "Z" and "N" and of the Maltese cross is to some extent an attempt to escape from these misunderstandings. The Maltese cross provides a figure in which many meridians are represented simultaneously. I have found it very useful in doubtful cases, although like every other refraction control it sometimes disappoints the examiner.

Eight or 10 years ago, in trying various tests on my own rather irregularly astigmatic eyes, it occurred to me that it might be possible to use the cross-cylinder test for axis in conjunction with some sort of geometric figure. I first tried concentric circles, but finished by employing the wagon-wheel type of astigmatic chart.

The two best charts of this general character with which I am familiar are the Verhoeff and the Lancaster-Regan. It will be remembered that Verhoeff, and Lancaster with Regan, have each devised one chart for testing astigmatic strength and one for testing astigmatic axis. In each instance it is the axis chart to which I now refer (see figure 1). Either one of these axis charts will serve very well for the combination test which I am about to describe. But, when used in conjunction with the cross-cylinder test for axis, the Verhoeff chart, in which radiating straight lines are superimposed upon concentric circles, has given perhaps slightly more positive results.

The manner of conducting the test is as follows: Before the eye which is being tested one places the spherocylindrical combination already found by other methods. While the patient looks at the chart, the examiner remarks that all the radiating heavy black lines are actually of the same intensity, but that when the supplemental lens (the cross cylinder) is held before the eye the lines will probably appear unequal in intensity.

Usually a 0.12 or a 0.25D. cross-cylinder is held in the same relation to the patient's axis as in testing for axis with the letters. That is, the plus or minus axis of the cross cylinder is held at 45° to one side or other of the axis of the cylinder in the trial frame. The patient usually notices a difference in the intensity of the radiating straight lines on

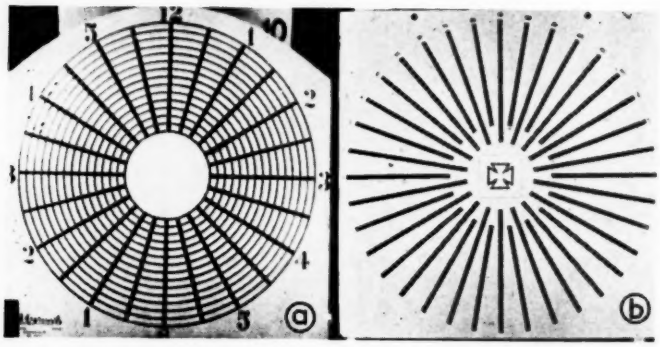

Fig. 1 (Crisp). a, Verhoeff dial. b, Lancaster-Regan dial (with addition of Beach's Maltese cross).

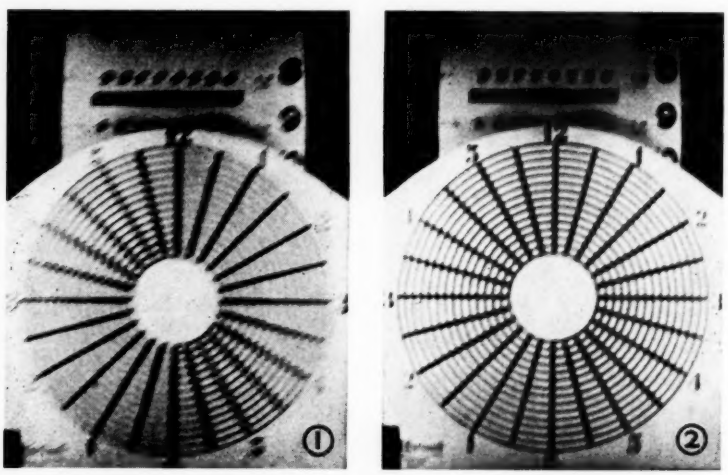

Fig. 2 (Crisp). Axis of —0.50 cylinder (correcting lens) has been placed at 105°. 1, Minus axis of cross cylinder is at 150°. 2, Minus axis of cross cylinder is at 60°.

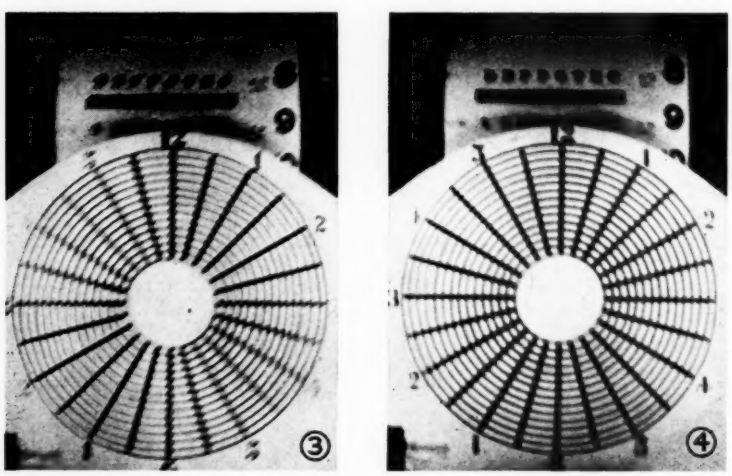

Fig. 3 (Crisp). Axis of correcting cylinder has been moved to 95°. 3, Minus axis of cross cylinder is at 140°. 4, Minus axis of cross cylinder is at 50°.

the chart, either in both positions of the cross cylinder or at least in one of these positions. The patient is then asked to tell which position of the cross cylinder the right position of the correcting minus axis will be at 90°. In the illustration (fig. 2) the correcting minus axis has actually been placed at 105°; the

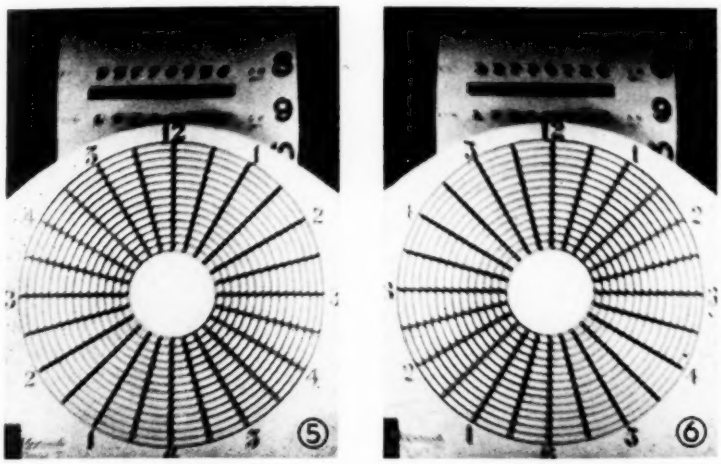

Fig. 4 (Crisp). Axis of correcting cylinder has been moved to 90°. 5, Minus axis of cross cylinder is at 135°. 6, Minus axis of cross cylinder is at 45°.

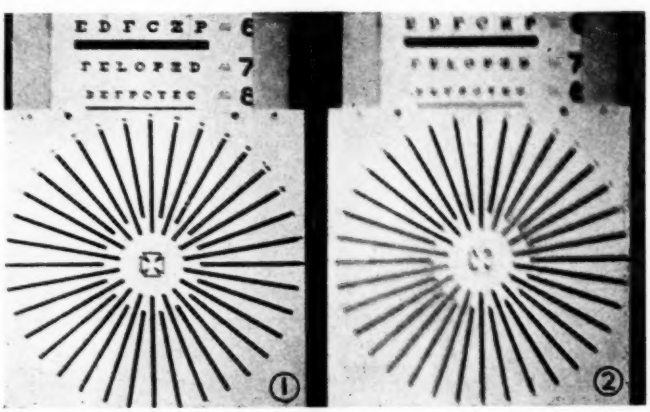

Fig. 5 (Crisp). Lancaster-Regan dial used with cross cylinder. Axis of correcting cylinder (—0.50) has been placed at 105°. 1, Minus axis of cross cylinder is at 60°. 2, Minus axis of cross cylinder is at 150°.

comes nearer (or "nearest") to making the lines on the chart as a whole look uniform in intensity.

In our present example, in which the photographic camera has been made a half-diopter astigmatic and so will serve as the "astigmatic eye," it happens that minus axis of the cross cylinder has been first (number 1) placed at 150° and then (number 2) at 60° (45° to either side of the 105° position). The camera obviously selects position number 2 as producing greater uniformity in appearance of the radiating lines.

In the next stage of the camera demonstration (fig. 3), the axis of the correcting minus 0.50D. lens has been moved to 95°. The cross-cylinder minus axis is held first at 140° (number 3) and then at 50° (number 4); that is, 45° to either side of the 95° position. Again the camera selects position number 2 as giving greater uniformity.

ing with test letters, as long as any variation is apparent. Often, with intelligent patients, the 0.12D. cross cylinder gives sharp results. Perhaps more frequently the 0.25D. cross cylinder is resorted to.

I present two illustrations of the same test in combination with the Lancaster-Regan axis dial (figs. 5 and 6). These correspond to the first and second stages

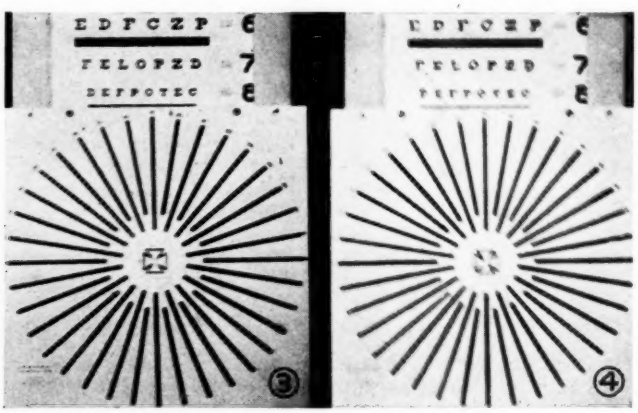

Fig. 6 (Crisp). Lancaster-Regan dial used with cross cylinder. Axis of correcting cylinder (—0.50) has been placed at 95°. 3, Minus axis of cross cylinder is at 50°. 4, Minus axis of cross cylinder is at 140°.

To complete the photographic demonstration, the axis of the correcting minus 0.50D. cylinder is placed at the proper position, namely 90° (fig. 4). This time the minus axis of the cross cylinder is held first at 135° (number 5) and then at 45° (number 6), and the camera indicates an equal departure from uniformity in both positions.

This equal departure from uniformity is the result to be aimed at. If no change in the axis is necessary, the variation in intensity of the lines will be equal in both directions. The patient's judgment may of course be checked by rotating the cylinder in one direction or another and repeating the test to find whether he brings the axis back to its previous position. The test is repeated, just as in work-

of the test as previously demonstrated with the Verhoeff dial.

I have to confess that the axis test which I have here described does not work equally well with all patients, and that it shares with other tests the quality of being occasionally less reliable or even of being misleading. No refraction test is to be regarded as universally reliable or final; but it is useful and sometimes necessary to be able to check the result of one test against the results obtained with several other tests. Frequently, before finishing a difficult case I have studied the axis by means of the cross-cylinder test with letters, the Beach Maltese-cross, and the test which is more particularly described in this paper.

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MALINGERING TESTS

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The simulation of visual defects is one of the most common forms of malingering encountered by medical examiners of draftees. The widespread custom of giving "eye tests" to public-school students has made the general public more or less familiar with the ophthalmologist's routine of examination, and has made it clear, even to those of a comparatively low level of intelligence, that coöperation between examiner and examined is essential to successful demonstration of existing defects or their absence. Therefore, almost any man who desires to evade military service reasons that it will be easy to "fool" the eye doctor because he must of necessity rely so largely upon the answers which the person under examination chooses to give him.

Those examining recruits for the Navy face the reverse of this situation. Because naval service demands more perfect vision than is required for those entering other military service, the percentage of rejections on this account is bound to be higher. This fact being known, men anxious to enlist in the Navy frequently seek to hide disqualifying defects. While the uncovering of such deception is generally easier than the simulation of disabilities which do not exist, it, too, presents pitfalls for the avoidance of which considerable skill and acumen on the examiner's part are required.

Examiners who have had industrial or compensation-claim work in civil life are likely to be more skillful in the detection of malingering than are those whose experience is limited to private and hospital practice. Being able to recognize the *type* of person prone to dissimulation is a great help, and this is something that no medical school can teach, nor textbook adequately describe. The malingerer in civil life usually hopes to obtain financial benefit by simulation of an injury or disease that does not exist; he is therefore likely to have laid a concerted plan to deceive with the aid of others who hope to share his profits. The man who seeks to evade the draft by pretending defects of vision is far less often coached beforehand. Popular opinion runs counter to such an attempt, whereas the majority of civilians consider the collection of "damages"—however dubious the way in which they were obtained—a legitimate procedure. Because his intent to avoid military service is unpatriotic, the malingerer keeps his own counsel, and so comes to the ophthalmologic examination with his part non too well rehearsed.

An exception to this type is the person who has undergone a number of previous "eye examinations," and is familiar with the methods and apparatus regularly used by ophthalmologists. If such a history is forthcoming the examiner may have something to put him on his guard, in this way being more alert to possibilities of fraud. A good general rule is to suspect any draftee who shows an extra intelligent interest before the examination begins. This advice will probably be called in question by many ophthalmologists who have made workmen's-compensation examinations, for the most astute seekers after undeserved "damages" in industrial work will assume such stupidity and lack of understanding of what the examiner is seeking to establish that the medical man is thrown off his guard and makes no attempt to circumvent his patient's lack of coöperation.

This pseudostupid type crops up in military examinations from time to time, so the ability to recognize him is important.

VISUAL DEFECTS MOST COMMONLY SIMULATED

The visual defects most commonly simulated by draftees are complete blindness of one eye, marked lessening of vision in one or both eyes, and—less frequently—accidental injury, either immediate or remote, resulting in inability to meet the standards for vision set for enlistment in the armed forces. Total blindness is seldom simulated, for the average draftee realizes that inquiry into his past history would soon unmask the fraud. Ingenious individuals may devise more subtle deceptions, but their very unusualness will, in most cases, permit prompt detection.

TESTS FOR COMPLETE UNILATERAL BLINDNESS

In the routine examination of the eyes the examiner is led to believe by the subject's responses that one eye has no vision whatever. The examiner should evince no surprise at this discovery, and should be on his guard during every examination to conceal his reactions from his patient. The examination should be extended to include several special tests, in addition to a particularly thorough general search, aided by all apparatus at hand, especially the retinoscope. Objective investigation of pupillary reactions and of ocular movements must precede the more elaborate tests requiring special apparatus, the examiner being careful throughout not to let the patient suspect that the possibility of fraud has entered his mind. Adhesion of cornea or lens to the iris or abnormal contraction of the lens are easily sought for and ruled out. The subject should then be conducted to the darkroom and the effect of light upon the normal eye observed (or re-tested if it has been part of the preceding general examination). The beam should then be shifted to the "blind" eye, covering the normal one meanwhile. If the retina of the apparently defective eye is insensitive, there will be no reaction on the sound side. If, however, the suspected eye is actually amblyopic, there will be a proportionate reaction in the pupil of the normal eye—this reaction being greater or less in accordance with the amount of light employed, and the actually existing defect in the retina of the affected side. A practiced dissimulator may easily defeat the aims of this test by partially closing the "blind" eye while attention is being directed elsewhere, which will give him a good idea of how much—or how little—he would see were it actually functionless or nearly so. Several different tests will, therefore, be necessary to unmask any fraud.

If the pupil is abnormally dilated, there is always the possibility of some mydriatic having been previously introduced. This would make the pupil of the eye in question immobile, while the normal eye would react under stimulation. If the pupil of the suspected eye fails to react to light, but contracts readily when stimuli inducing convergence and accommodation are applied, it is a reasonably sure proof that the eye is actually sightless. Total unilateral blindness, or a marked degree of amblyopia, does not necessarily prevent deviation when the sound eye looks toward some fixed point.

A test decribed by Sugar in a recent article, though not new, has been so well outlined that I take the liberty of quoting verbatim:

> *Test Depending on the Change in Size of the Visual Angle:* As visual acuity charts are based on letters subtending angles of five minutes at 20 feet, any change in the distances at which the letters are read, changes the visual angle. If the 20/100 letters are read at ten feet, for example, they are equivalent to 20/200 letters. Inconsis-

tencies in reading the various lines at different distances should give good evidence of malingering. The same principle can be used with a reverse chart and mirror. The patient does not usually realize that by reading the chart in a mirror, the distance from chart to patient is doubled. If he reads the same line in the reversed chart and mirror that he does with the unreversed chart alone at the same distance, he is obviously malingering.

Other tests based upon the visual angle have been devised, such as that in which 100 cards are used which have pasted upon them one of the letters from the Snellen chart. The cards are square and of the same size, but the size of the letters varies greatly. The cards are shuffled and then set upright for the patient to read when standing at a distance of about 15 feet. A careful record is kept of the letters recognized by the patient and their size later compared with the sizes of other letters that the patient claimed he could not see. Any marked variation from recognition when the chart was in regular arrangement or other discrepancies furnish good evidence of fraud on the patient's part. This test was described by Roche.

Cuignet's test or the bar-reading test

This is a comparatively simple device, but widely recommended in medico-legal ophthalmology, as also in the textbooks of Snell or general works on malingering. To carry out this test, the examiner holds a straight object, such as a pencil or penholder (Snell suggests a wooden tongue depressor) midway between the eyes of the subject and a book given him to read while the test is in progress. He must be instructed beforehand not to stop reading, nor to move his head nor change the position of the book. Another method is to hold the straight object in front of the "good" eye at a distance of three or four inches. When the object is held midway between the eyes and the book, some five inches of the print lying between the object and each eye, will be blocked out, but inasmuch as these blocked-out areas do not correspond, if both eyes are functioning, there will be no interruption to the reading. So if the subject does not omit any words without changing the position of either head or book, he is not blind in one eye. When the object is placed before the "good" eye, it covers but a part of the print visible by that eye. If the reading is not interrupted, though head and book are not moved, the reading is being done with the "blind" eye. This test though simple, is one of the best for detecting that a claim to unilateral blindness is false.

Bishop Harman test

The Bishop Harman test requires a comparatively simple apparatus, consisting of a wooden arm, 18 inches long, approximating the dimensions of an ordinary ruler, carrying at its distal end a vertical support for test cards of varying sizes. In addition a screen is employed, about 2 by 2 inches in size, placed vertically five inches from the carrier, in the center of which is a round (or right-angled) hole, with a diameter of three quarters of an inch. A handle is attached beneath the apparatus at the center of the bar.

The underlying principle of this test is that when test objects, such as letters, numbers or complete sentences, are seen at ordinary reading distance as the subject looks through a properly placed opening of small size, his right eye will see only the test letters of the *left* side, while his left eye reads only those of the *right* side. Special test cards are used, 2 by 2½ inches in size, upon each of which are printed two or more letters or figures of equal dimensions, so arranged as to cover the entire card when held horizon-

tally. The size of these different characters is graded from the largest, which produce a 50-minute angle, to the smallest, which form a 5-minute angle.

In making this test the examiner should watch carefully to prevent the subject from closing one eye, which a perfectly honest person may often do when asked to look through a small aperture. If he attempts to do this, the examiner should instantly remove or cover the test object.

The procedure is as follows: The examiner selects the cards, first one having the larger size of test letters, then successively smaller sizes, placing them in the carrier at the far end of the arm. The other end of the apparatus is held directly under the subject's nose, so that he can look with both eyes through the hole in the screen. He then reads whatever he is able to make out on the test card within his vision. If sight is good, the subject will be able to read all the large test characters. The cards are removed when read, smaller and smaller test letters being thus exposed. If the subject can read *all* the characters, or those at both ends of the line upon any card, he has sight in both eyes. Failure to read those on the left indicates failure of function on the right side, and *vice versa.* Snell states that many malingerers will not read the characters on the right side if they have claimed blindness of the *right* eye, or on the left, if the left eye has been alleged to be sightless. But actually the subject would be reading with the eye he claimed sightless, and not with the "good" one, wherein consists the excellence of the test. But if the subject is permitted to close either eye, the test will fail. Lloyd, in a personal communication to Lasky, suggested that the subject suspected of malingering may be prepared for the Bishop Harman test by having him first make use of the amblyoscope, so adjusted that the images are *not* crossed. This instrument, doubtless well known to all present, is designed for the exercise of squinting eyes, but may also be used for demonstration of binocular vision, as will be explained subsequently. Used before the Bishop Harman test, the subject suspected of malingering will see the images uncrossed and will be prepared for the same situation with the Bishop Harman instrument, wherein the images are crossed.

AMBLYOSCOPIC TESTS

The amblyoscope consists of a pair of tubes somewhat resembling opera glasses, but each tube bent outward at a 120-degree angle, with a mirror set in each angle, so placed as to be unrecognizable by the subject. When the subject looks into the tube, he sees, not the object at which he believes himself to be looking, but the image displaced by its reflection in the mirror, to a position directly *opposite* to its actual location. As both eyes are thus deceived the right eye sees what is actually on the left, and the left eye what is on the right. Two sets of types are suspended at the same level, separated from each other by about 8 feet. The subject is asked to stand about 12 feet from the cards, and midway between them. The plus-8 lens of the amblyoscope is neutralized by placing a minus-8 lens in the slot of the eyepiece, and allowance must be made for any refraction previously established for the subject. The instrument is given to the subject with the request that he read the letters visible with his "good" eye. As he does not know that he is looking into a mirror, if he reads one side he will be using the eye of the opposite side, so the amount he can see will gauge the amount he can see with the "blind" eye.

Another method of using the amblyoscope to detect fraud is known as the

bird-in-the-cage test, which Beaumont describes thus:

> In the slot for one eye is placed the slide of a bird (usually supplied with the instrument) and in the slot pertaining to the other eye a cage. The tubes are sufficiently diverged to give a single image. The patient does not know that the images are crossed, nor even that part of the picture is seen by one eye and part by the other, and when he is asked what he sees, if he is a malingerer he is almost certain to betray himself.
>
> A further test with this most useful of amblyoscopes is obtained by approximating the tubes until we get a double image. On the side of the "bad" eye we place a slide on which are test types for near vision arranged for mirror reading, and as the image is crossed the malingerer will think he sees them with the good eye, and read accordingly.

In 1935 Bach put forward a test depending upon the normal phenomenon of nystagmus when looking at moving objects, which he designated as an "optokinetic nystagmus test," for the application of which a special instrument had been designed. This instrument consists of a vertical drum 25 cm. high by 19 cm. in diameter, on which are painted alternating stripes of black and white, each stripe being 25 cm. in width. Through the drum's vertical axis a central rod is run, so that the drum may be slowly revolved about it. The center rod is fastened to a handle placed beneath the drum, the whole instrument somewhat resembling a kymograph of primitive construction. When the drum is slowly turned before the eyes of the subject under examination, rotating from either right or left, nystagmus will usually be induced in functioning eyes. This phenomenon is explainable by the fact that when either subject or object moves, the individual can see objects only when the eye is momentarily fixed on one object after another. This "optokinetic nystagmus" is the nystagmuslike twitching eye movements to be noted when an individual is looking at a series of moving objects, as when he is viewing the scene from the window of a moving train or automobile.

The instrument is employed as follows: The drum is held in front of the subject at the usual reading distance, or possibly slightly farther off, after which he is asked to look at the stripes and tell whether they are moving or standing still. If a person with two normal eyes looks at the device, nystagmus will at once be induced.

In examining a man with an allegedly "blind" eye, the subject's good eye must be "accidentally" covered up by the intervention of a card, or even the examiner's hand. If the "blind" eye shows optokinetic nystagmus it is positive proof that the eye is not sightless.

TESTS USING SPECIAL OPHTHALMIC EQUIPMENT

The tests so far described require only simple apparatus for their application. But examiners for military service should be equipped with all the devices available to the best private practitioners, so these should be at hand for the detection of malingering.

Prism tests. A prism dislocates binocular vision, so that the image seen by each eye is independent of that seen by the other eye. If a malingerer has not had previous experience with refraction technique, including the action of prisms, he can be easily exposed. Otherwise it may be the examiner who is to be "fooled." In applying any prism test reliance is placed upon that law of optics which rules that rays of light are deflected when passing through a prism. This causes an object viewed through a prism to appear to be in a position in space different from that which it actually occupies. When one of the subject's eyes is open the while a strong prism is placed before the opposite eye, if his sight be normal he will

see two images of everything—the first being the true position, the second the false image, refracted by the prism into another position. If a malingerer's mind is confused by this duplication, he will be uncertain in his answers because he does not understand the relationship between the eyes and the artificial diplopia induced by the prism.

A prism is placed before the "blind" eye and the subject told to look at a light. If he says he does *not* see double, he is either amaurotic or is malingering; if diplopia is admitted, he is either hysterical or malingering, and hysteria can usually be ruled out in military work. If he says he does *not* see double when the prism is in front of the "blind" eye, the prism should then be placed before the other eye, and the question repeated. This will often expose a malingerer, for he is apt to think that the "glass" itself has powers of duplication, so when it is placed before the eye that is not "blind," he will say that he now sees double, which, of course, is untrue. Beaumont warns, however, that an intelligent subject who actually has slight amblyopia of one eye, will be able to recognize the dulled image as it actually is, and may ignore or suppress it.

Prism tests are probaby the oldest special devices for detecting fraud in regard to vision, and were employed in countries having unpopular compulsory military service, Germany in particular, early in the nineteenth century. Von Graefe in 1867 placed the edge of a strong prism before the sound eye, meanwhile covering the "blind" one. The prism was at first so placed as to cover but half the pupil of the sound eye. Then the "blind" eye was quickly uncovered, and at the same instant the prism was pushed all the way across the sound eye. If the subject then saw double, he was undoubtedly a malingerer.

In the intervening three quarters of a century the principle of this test has been utilized in devices more difficult for the malingerer to circumvent. A modification by Baudry (quoted by Lasky) consisted of a box arrangement containing a triangular prism having a special base, which could be so manipulated that the subject under examination could not possibly tell what part of the prism was before the eye which he claimed was his only "good" one. By using a red light, the chance of having unlike images in the two eyes is avoided. If the subject admits seeing double, the fraud will be exposed.

Spherical lens tests. First correct the subject's refraction for distance vision, in both eyes. Then add a plus-3D. sphere to the "good" eye, which will prevent it from reading the smaller test types. The subject is then instructed to begin reading the larger letters, both eyes being held open. When he has read as far as he can, the "bad" eye is covered, and the subject requested to read again from the top. If he does not read so far down as before, it will show that he was previously reading with the "bad" eye. But should he stop at precisely the same letter or line, it will be a point scored in his favor.

If the preliminary examination has shown the subject to be presbyopic, the same test may be used, but a minus-8 or minus-10D. sphere, or even less, should be used in place of the plus-3. The "bad" eye is corrected for near vision and the test card placed in the subject's hand, with the request that he read the smallest line of type he can make out. Covering the "bad" eye, he is again asked to read the smallest letters visible to him. Should he repeat his previous selection, the indication is that no fraud is intended, but if he now cannot read so far down, he will at once perceive that his deceit is unmasked, for previously he must have have been reading with the "bad" eye.

This test may be varied by placing a plus-10D. sphere before the "good" eye in addition to the subject's refractive requirement. The exact correction for reading is placed before the "bad" eye. The chart is then held at a distance of only an inch or more from the eyes, and the subject asked to read some of the smaller lines. As he reads, the examiner very slowly draws the chart back from his eyes until it is 20 to 30 inches distant. If he continues to read, it will be with the "blind" eye, because the "good" eye, when fitted with the plus-10D. sphere could not see at that distance. This test may also be carried out with cylindric lenses.

Stereoscopic testing. The stereoscope can be employed in the detection of malingering in much the same way as the amblyoscope, already described. The chief difference is in the test objects, which have stereoscopic attributes, being known by the name of *stereograms.* The pictures or letters employed thus should have familiar characteristics, which can be divided into two equal sections, one section for each half of the stereogram, the two parts being so combined as to be seen as a complete picture when both eyes are used.

In conducting the test, Snell advises the examiner to begin by using a number of complete stereoscopic pictures; or, when words, letters, or numbers are used on the stereograms, one should use those having like characters on both parts, so that the examiner may learn the possible behavior of the subject and the subject himself may become familiar with the instrument. By this preliminary testing, he may be deceived into thinking he is using his "good" eye only, because the preliminary test letters or objects are alike on both sides, so will appear the same whether seen with either or both eyes. Thus, if the subject closes one eye with a view to finding out what he would really see if he were blind on one side, he will be no wiser than before. But previous experience will put him on his guard and render most stereoscopic tests useless. The examiner must, of course, be on the alert to see that both the subject's eyes are open throughout the test.

After these preliminaries simple stereograms should be used, such as four colored dots, two on each side. The subject is asked how many he can see. If he sees four, he has binocular vision; if he says three, he has fusion and sees with both eyes; but if he sees but two, one of his eyes is really defective.

On many Keystone stereograms and on some of those made specially for stereoscopic testing, there are short vertical and horizontal lines which may be used in the detection of malingering. If the subject can see both vertical and horizontal lines, he has some vision in both eyes; if he says the lines cross, he possesses some degree of fusion, his acuity being probably above 20/100. Targets and dots of various sizes, graduated in size and placed in different positions, will serve a useful purpose in detecting fraud. One stereogram may have dots and targets alike on both halves, but the dots may be omitted from one of the divisions on two companion slides. By using such sets of stereograms, the examiner may be able not only to detect counterfeit unilateral blindness, but also to ascertain the subject's actual visual acuity, and his degree of fusion.

Gradle's test. Polaroid discs, 35 mm. in diameter and 2 mm. thick, are used in Gradle's test for malingering, which he describes as follows:

> Three discs . . . are held in the ordinary trial frame with the handle corresponding to the polarizing axis. One Polaroid disc is placed before each eye with the polarizing axis horizontal. Before the uninjured eye, the third Polaroid disc is placed with the polarizing axis still horizontal. The patient is then asked to read the

smallest possible line of letters on the test chart, with both eyes open. Immediately the third Polaroid disc is rotated so that the polarizing axis becomes vertical for the length of time it takes to read three or four letters. The rotation of the third disc to the vertical position prevents the passage of any light so that if the reading of the test chart is continued during this time, it is very evident that the injured eye is functioning.

This test must be preceded by correction of the subject's refraction.

Other polaroid-disc tests are mentioned by Sugar: In one the Ferree-Rand projector is used, and in another the Project-O-Chart. In the former a polarizing filter is placed in the cell next the slide plane, and rotated through 180 degrees, the subject wearing glasses of polaroid filters set at 45 degrees in the right eye, and 135 degrees in the left eye. With the polaroid filter in the projector set at 90 degrees, both the subject's eyes can see the target; but if it be rotated to 135 degrees, the target is visible to the left eye only, whereas rotation to axis 45 degrees makes it visible to the right eye only. The examiner does not change the subject's spectacles at any time, but confines his operations to the projector filter, thus being able to trick the patient by "a remote-control method."

In the second test mentioned, a polaroid disc is placed in the projector in such a way that it can be rotated by a handle. The subject's frame is fitted with polaroid filters at 90 degrees for one side and 180 degrees for the opposite eye. The letters on the Project-O-Chart become invisible to one eye or the other, as the disc in the projector is rotated to 90 or 180 degrees.

Color tests. The Snellen color test, although one of the most familiar, still remains among the best. It rests on the principle of the action of complementary colors; that is, green letters will be obliterated when viewed through red glass, and, *vice versa,* red letters will be obliterated by the interposition of green glass. A red glass is placed before one of the subject's eyes, and a green glass before the other eye. On a glass slide the word FRIEND is printed in letters alternately green and red. The subject views this slide and reports what letters he is able to read. If he has vision in both eyes, he will read FIN with one eye and RED with the other, as he reads green letters through his green glass and red ones through his red glass, thus proving that he is not blind in one eye.

Worth's modification of the Snellen test is known as the "four-dot test." A piece of plain ground glass, 12 by 9 inches in size, is covered on the back with opaque black paper, in which four round holes have been cut, each hole having a diameter of 3 inches. The highest hole has a piece of red glass cemented over it; the two holes next below are covered with green glass, and the lowest hole is left clear. This contrivance can be suspended in a window, or, better, have an electric light placed behind it. The patient is fitted with a trial frame with one red and one green glass as previously described. He stands at a distance of 15 to 18 feet. If he sees two dots (red and white) he is using only his right eye; if he reports three dots (one white, two green) the left eye only is functioning. But if he says he can see all four dots (white, red and two green) both eyes are functioning. To avoid fraud, the eye glasses should be interchanged in the frame, and the test repeated.

DETECTION OF SIMULATED "NIGHT BLINDNESS"

In the present war, when "blackouts" and service in out-of-way parts of the world make it more essential than ever that men should be able to "see in the dark," simulated "night blindness" becomes a special feature of malingering,

because its detection depends so largely upon the responses of the subject under examination. Bishop Harman has recently published a test that may prove helpful to the ophthalmologist faced with this problem. The test was originally devised in the first World War, to detect shamming in subjects whose eyes showed no marked abnormalities on objective search, but whose responses showed vision much impaired. The standard candle-box is used, but is equipped with a projection through which light passes to a set of white discs on the test board. A cap, like a pill-box lid, can be made, its flat surface of semitransparent, grease-proof paper; the density of this screen can be chosen so that it cuts off half the candle light. The light may be increased instead of diminished; a hand-torch may be held beside the box in such a way as to reinforce the candle light three or four times.

If the subject is really night-blind, his vision will be worse when the light is diminished, with brighter light he will see better and farther. The test may be varied by altering the size of the discs on the test board. Normally they are a half inch in diameter, placed one-eighth inch apart. Harman inserts an extra group between groups 4 and 5 on the board, putting in four discs, three-quarters inch in diameter and one-quarter inch apart. "Thus the size and distinction of the discs in the candle light can be suddenly altered by turning the test cover during the examination." Care must be taken to cover the subject's eyes whenever the changes are being made, so it is best that the examiner stand by the subject, while an assistant manipulates the light or the test sheet.

A person really subject to night blindness will be consistent in his responses to the variations in the light or the size of the discs, whereas a malingerer with normal dark adaptation will almost certainly betray himself.

A military ophthalmologist of exceptionally wide experience Henry Smith (2d) of the Indian Medical Service, encountered feigned night blindness very often in his work among native Indian troops. He points out that idiopathic night blindness is a symptom of bilateral slowly and uniformly progressive degeneration of the retina, advancing equally in both eyes. "In the early stage there is very little wasting of the retina. The atrophy slowly and steadily progresses, until at last only the choroid appears, except a faint yellow spot and the optic disc. Every structure of the retina atrophies in harmony with every other. . . . The quickness of the reaction of the pupil to light becomes progressively sluggish, *pari passu* with the progress of the disease."

But the malingerer always presents an "early" case, so the condition of the retina does not help. The reaction to light is little altered in the primary stage, and to detect shades of sluggishness in the reaction of the pupil to light requires a highly trained eye in the examiner. But *the size of the field of vision* can be accurately determined, which Smith describes as follows: "Having ascertained that our own field of vision is normal, we cover one of his eyes and fix his other eye with our corresponding eye, at a distance of, say, 15 inches, and proceed by the direct method to compare his field with our own. If it is the same in both eyes as that of the observer he is not night blind, as this disease is equally advanced in each eye."

Electroencephalography has been suggested by Frederick Lemere as a means of determining whether a subject be actually night-blind. The method is, however, too technical for the average examiner of draftees to undertake.

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SURGERY OF THE INFERIOR OBLIQUE AT OR NEAR THE INSERTION*

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The thesis presented by me to this Society, in 1933, dealt with the underacting superior rectus, and it seemed to me that this is the proper place to report the modifications in diagnosis and the results of treatment since that presentation was made. As stated at that time, the condition may vary from a slight paresis to a complete paralysis. The picture changes, too, depending on whether there is binocular single vision or whether the paretic or the nonparetic eye is the fixating eye. Another important variation to consider is whether the paralysis is unilateral or bilateral. If it is bilateral, it must be determined whether the superior recti are equally paralyzed, and if the secondary deviations of the inferior obliques are or are not equal. If the superior recti are equally paretic and fixation alternates, the picture differs greatly, depending on whether or not fixation is in the field of the paretic muscle. If fixating with the right eye in eyes right, the secondary deviation of the left inferior oblique is marked. Fixating with the left eye in eyes left, the right inferior oblique shows a marked secondary deviation. However, if fixation is with the right eye in eyes left and with the left eye in eyes right, no secondary deviation is present, except when making the screen comitance test, which compels the right eye to fixate in eyes right and the left eye to fixate in eyes left. When fixating out of the field of the paretic muscle, the secondary deviation may be absent; it is never marked, and may be disregarded. If the eye with the more paretic superior rectus is used to fixate, there will be a hyperphoria or a hypertropia of the other eye, and on most tests a hypotropia of the fellow eye, when the less paretic muscle fixates. When the screen test is used in the primary position, these cases will usually show a double hyperphoria or hypertropia. By

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screen comitance test, a double hyperphoria or hypertropia is always demonstrable; that is, a left hyperphoria increasing in eyes up and right, and a right hyperphoria increasing in eyes up and left. These variations must be observed closely before any treatment, especially surgical, can be selected.

In order to correct a vertical imbalance by surgical procedure the questions involved are: (1) Whether to shorten, by some means, the paretic superior rectus, or to weaken the inferior oblique of the other eye; (2) whether, in bilateral paresis of equal severity, to shorten both superior recti or to lessen the action of both inferior oblique muscles; (3) when the pareses of the superior recti are unequal and the secondary deviations of the inferior oblique muscles are likewise unequal, the question is—how can the desired results best be obtained?

In the thesis previously mentioned, I described a modified tenotomy of the inferior oblique, removing a portion of the muscle from its sheath. No partial tenotomy at the origin can be graduated accurately enough to be dependable.

It occurred to me that if a surgical procedure could be performed on the inferior oblique at or near the insertion of the muscle, it could be more accurately graduated. The procedure may be a recession or a tuck, similar to the superior-oblique tuck described by Wheeler. I have found that a myectomy at the origin of the inferior oblique and a complete tenotomy at or near the insertion of this muscle give about the same results when a complete paralysis of the inferior oblique is desired, but that, if not wisely chosen, the occasional result may be a predominant right or left hyperphoria.

Given a unilateral hyperphoria or hypertropia of over 15 prism diopters, increasing definitely in the field of the paretic superior rectus, a tenotomy or a myectomy at the origin is still very satisfactory, but when there is less than 15 prism diopters, or in cases of bilateral

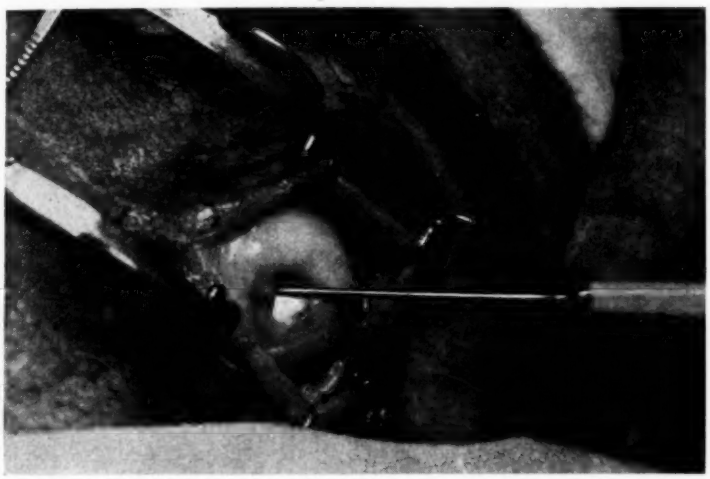

Fig. 1 (White). An incision is made through the conjunctiva and Tenon's capsule down to the sclera. The incision is below the lower border of the external rectus, and is carried down and out at a 15-degree angle. The strabismus hook is introduced as shown, and is withdrawn with the point vertically. Tenon's capsule is snipped to release the point of the hook.

Fig. 2 (White). The second hook is introduced and, by separating the two hooks, a blunt dissection is made back to the insertion. Not infrequently the inferior oblique has definite communicating bands with the lower border and under surface of the external rectus. These should be carefully freed. This union between the two must be looked for when performing a resection of the external rectus, as the inferior oblique may be tenotomized by accident.

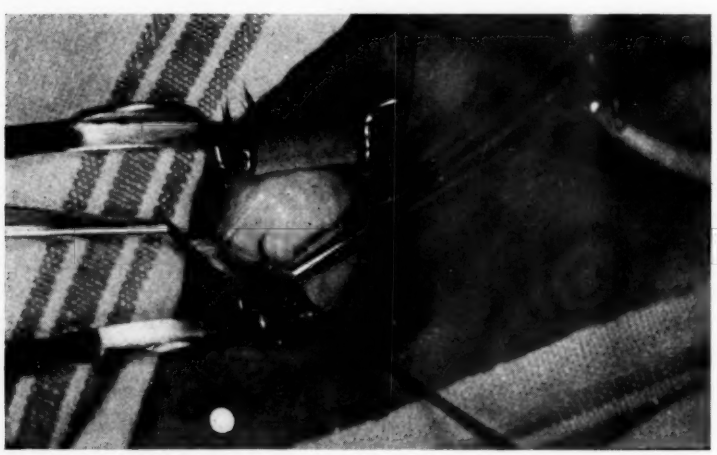

Fig. 3 (White). When the inferior-oblique recession is combined with a resection or recession of the lateral rectus, the latter muscle may be held in the muscle forceps after it is tenotomized at the insertion, or the sutures may be placed at once for the resection or recession. A suture is then passed through the inferior oblique. It is not necessary or advisable to tenotomize at the point of insertion, but a short portion of the muscle at the insertion may remain.

superior-rectus paralysis, the outcome is not uniform, and not infrequently overcorrections result.

Case reports

Case 1. In 1936, D. D. was seen to have a right hypertropia of 7D. Esotropia for distance, 20D.; esotropia for near, 40D. Hypermetropia, +2.50 in both eyes, with 20/20 vision in each. The right hypertropia did not increase enough in eyes up and left to warrant a tenotomy of the right inferior oblique. The patient had third-degree fusion when the right hypertropia and esotropia were corrected in the amblyoscope. I receded the right inferior oblique about 5 mm., and now, six years later, the result is an overcorrection of less than 1D. A resection of the left superior rectus might have given an equally satisfactory result, but since the muscle would still have been paretic, an increasing secondary deviation of the right inferior oblique might have developed. The latter did occur in one of my patients who was so treated.

Case 2. R. K. had a convergent strabismus with a marked bilateral superior-rectus paresis. The secondary deviation of each inferior oblique was so great that a bilateral tenotomy at the origin seemed justified. The cosmetic result was quite satisfactory, with a correction of the hypermetropia. Three years later the patient returned, and a resection of the external rectus and a recession of the internal rectus gave a most satisfactory cosmetic result. When he returned seven years later, the eyes in the primary position were straight, with binocular single vision, but in eyes up and right there was a paralysis of the left

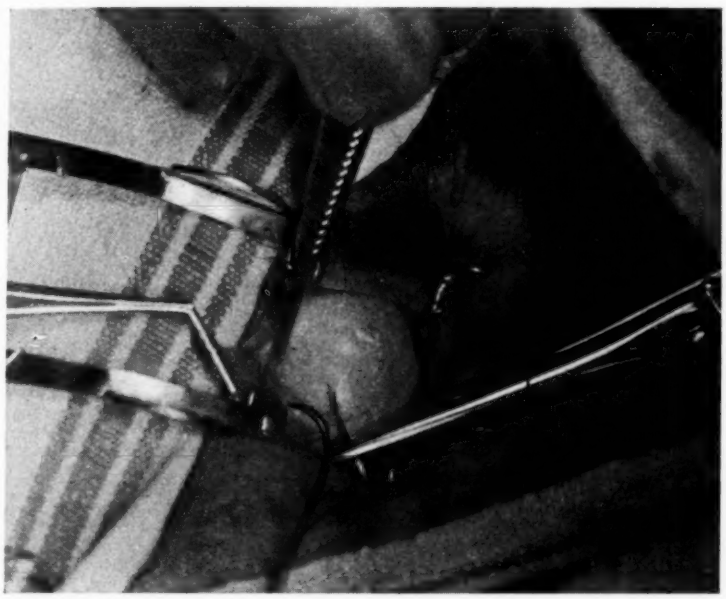

Fig. 4 (White). The lateral rectus is held in the muscle forceps. The suture through the inferior oblique is in place. When the amount of recession has been decided upon, the needle is passed through the sclera. The point of the needle should always be kept in sight, as Jameson advises in his recession of the internal rectus. The oblique is now tenotomized, and, when the suture is tied, the new insertion is located at the needle.

inferior oblique when he tried to fixate, and a secondary deviation of the previously paretic right superior rectus. In eyes up and left there was a right inferior-oblique paralysis, with a secondary deviation of the left superior rectus. It is evident from figure 1 that the superior recti were not equally paretic, nor the secondary deviation of the inferior obliques equally marked.

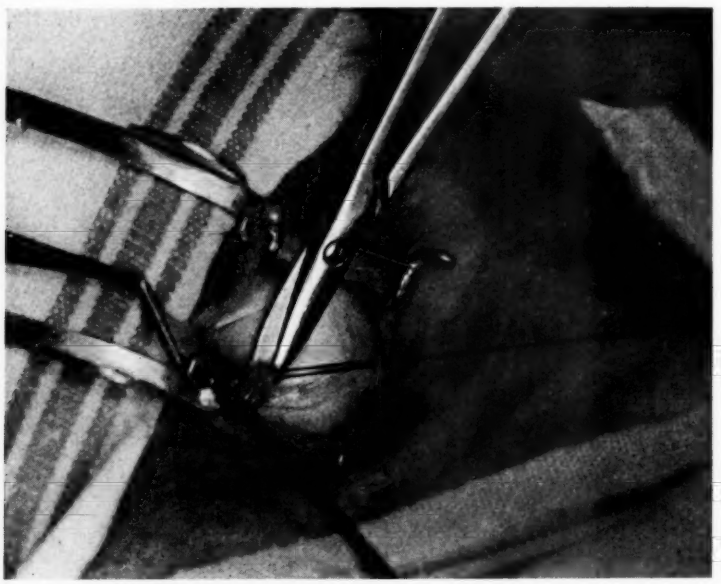

Fig. 5 (White). After the inferior oblique is dissected, preferably by blunt dissection, the suture may be placed through the muscle, as near the insertion as is practicable and safe. The muscle is then cut on the side of the suture toward the muscle insertion and is sutured to the sclera.

This patient was operated on before I had performed recessions. Now I should recede both obliques—the right more than the left.

In all bilateral cases now, where surgery of the inferior oblique muscle is indicated, the inferior obliques are receded in either equal or unequal amounts. I cannot advise just how much to recede for given amounts of correction. This corresponds to the experience in the recession of other muscles. The results have been so much more accurately judged and permanent when receding the inferior obliques, rather than performing a tenotomy or myectomy as I formerly did, that I feel that in this procedure we have a much more definite and accurate means of control.

When there is an associated convergent or divergent strabismus, the external recti may be prepared for a resection or recession, but before completing the operation the inferior oblique can be more easily engaged and receded. This combined operation through the one conjunctival incision is proving more and more satisfactory.

Not infrequently, when the lateral deviation is high in amount—that is, over 60D. of esotropia or exotropia—and the vertical deviation is not excessive, it is advisable to correct a part of the lateral deviation first. In this way the vertical

deviation can be much more accurately estimated before one decides on how much the obliques should be receded.

The muscle may also be receded to limit the secondary contracture resulting from a paralysis of the superior oblique of the same eye.

Having followed this technique at the New York Post-Graduate Medical School and Hospital since 1936, I have confidence enough in the method to present it before this Society.

The writer is indebted to Dr. Harold Whaley Brown for the dissections and photographs.

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OCULAR ROSACEA*

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Rosacea may be classed as an old disease. In the middle ages it was called "gutta rosea" and later Plenck (1738-1807) called it "gutta rosacea" (see Reyn[1]). Rolleston[2] noted references to rosacea by both Shakespeare and Chaucer. He also mentioned a celebrated picture of a rhinophyma by Ghirlaudajo (1449-1494) which formerly hung in the Louvre, and cited one ancient Greek reference to a nose "of probable rosacea origin." Batemann (1778-1821, see Reyn[1]) was the first to use the term acne rosacea.

At first acne rosacea and acne vulgaris were confused and thought to be manifestations of the same disease. Later the two entities were distinctly separated, and the tendency today is to reserve the term acne for acne vulgaris and to designate acne rosacea simply as rosacea. This was first suggested by P. G. Unna about 1900 (see Reyn).

In spite of its age no ocular complications of rosacea were noted until 1864 when Arlt[3] first described them. He mentioned conjunctivitis and keratitis as possible complications, either one or both occurring in seven or eight rosacea cases seen by him.

Since then, and especially since 1900, this subject has appeared frequently in the literature.†

OCULAR COMPLICATIONS

In general, there appear to be four ocular complications of rosacea, as follows:

1. *Rosacea blepharitis* is characterized by red, slightly thickened lid margins, frequently with the appearance of an oily secretion or small crusts and scales near the roots of the cilia. When the skin of the lids is stretched, a superficial vascular network is usually quite prominent and becomes even more apparent in the region of the lid margins, frequently giving a violaceous color to this part of the lids. Chalazia seem to occur more frequently in patients suffering from rosacea blepharitis. Symptoms may be entirely absent or quite annoying. When present, they usually consist of a feeling of "heaviness" about the eyes, dryness,

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† See references 1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17.

burning, or other symptoms of asthenopia.

2. *Rosacea conjunctivitis* is characterized by vascular dilatations in all cases and conjunctival nodules in some. The vessels of the palpebral conjunctiva and especially those of the lower lid are more prone to dilatation than those of the bulbar conjunctiva. When the bulbar region is involved, it is more apt to be that portion situated in the interpalpebral aperture than that protected by the lids. The dilated vessels remain as distinct entities, sometimes very widely dilated and tortuous, at other times forming a sort of network. Ordinarily they do not tend to dilate as a diffuse blush or a "beefy conjunctiva."

The nodules are not present in all cases, and when present may vary considerably in number. They range from small scattered translucent elevations to larger and semiopaque ones, and occur on the bulbar conjunctiva almost exclusively. Von Szily[18] described the pathologic changes in these nodules and showed that they had no specific characteristic features, the picture varying to some extent with the age of the nodule and its size. The smaller and younger ones were much like lymph follicles, whose center was made up of lymphocytes and a few epithelioid cells, the entire mass being surrounded by a vascular network. Lymphocytes were prominent at first, but later tended to disappear, and epithelioid cells, giant cells, and connective tissue replaced them. The larger nodules sometimes were necrotic in the center and tended to become ulcerated superficially. Von Szily also stated that fibers with giant cells about them in the middle of some of the nodules suggested fungi, but that several cultures from such areas were negative.

The symptoms of rosacea conjunctivitis are sometimes more troublesome than those of rosacea blepharitis but are essentially the same in both conditions. In cases of active conjunctivitis there is frequently a thin, watery or slightly mucoid discharge, and the patients are apt to complain of their "red eyes." Unless ulcerated, the conjunctival nodules are usually symptomless. Opposed to the findings of Von Szily are those of Vardaguer,[19] who stressed the scanty secretion in rosacea conjunctivitis and made the unqualified statement that the grayish red phlyctenulelike nodules of rosacea never ulcerate and thus differ from real phlyctenules, which may do so.

3. *Rosacea keratitis* can be the most severe ocular complication of all. It may vary from a symptomless mild superficial vascularization of the cornea at the limbus, to a severe superficial and deeper vascularization of the cornea attended by infiltrates, ulcerated areas, loss of vision, and the severest of symptoms. The infiltrates are of the type seen in the early stages of catarrhal marginal ulcers—that is, subepithelial, with a clear zone between the infiltrate and the limbus—or, along with the vessels, they may extend in from the lumbus as a tongue-shaped opacity. The cornea may be subject to superficial punctate staining, and frequently does take the stain over the area of infiltration, especially in cases of the marginal type. Symptoms consist of severe photophobia, blepharospasm, copious tearing, and actual pain—in some cases with corneal ulceration. The discharge in the cases lacking secondary infection is nonpurulent. A marked ciliary injection accompanies active keratitis. In the later stages, after periods of exacerbation and healing, the whole cornea may be irregular in transparency and thickness, with filmy or dense vascularized or nonvascularized scars throughout. A band keratitis may intervene.

4. *Rosacea iritis* was originally thought to be a nonspecific type, occurring only in cases in which there were severe cor-

neal involvement and ulcers.[4] Frank hypopyon in the anterior chamber has been reported.[20] Oláh,[21] in 1932, reported the first instance of a specific iritis due to rosacea. This was a case of facial rosacea presenting a mild rosacea keratoconjunctivitis and rosacea iritis in one eye. The other eye was entirely normal. In the description no mention was made of the condition of the anterior chamber nor of the presence or absence of pain. The iritis was described as being limited to the pars ciliaris, associated with dilated vascular networks, small iris nodules, and a blue to gray-green discoloration of this part of the iris. The pars pupillaris was not involved. The pupil was difficult to dilate with scopolamine and, when finally dilated, no synechias were seen. The iritis dominated the ocular picture. Tuberculosis, syphilis, and iritis nodosa were believed to have been ruled out in this case on clinical grounds and by appropriate tests. In 1938 Oláh[22] reported a second and even less convincing case of facial rosacea in which one eye was normal and rosacea iritis affected the second eye. The lids and cornea of the involved eye were completely normal. The picture of the iris was similar to that in the original case, and the fact that the pathologic changes were limited entirely to the pars ciliaris was again stressed. Between the appearance of these two case reports, Salus[23] reported four cases of rosacea iritis that showed changes similar to those in Oláh's first case. In all of his cases, however, there was severe rosacea keratitis as well as facial rosacea, and it was Salus's opinion that the iritis was due to toxins from the keratitis rather than to any specific involvement of the iris, for he had found no rosacea iritis in many cases of facial rosacea that he examined. One of Salus's patients showed a posterior synechia.

Thus our knowledge of rosacea iritis is as yet incomplete. Whether it is a specific entity presenting characteristic findings or a nonspecific iritis secondary to a severe rosacea keratitis remains to be decided.

All authors agree that rosacea blepharitis, conjunctivitis, keratitis, and iritis occur in this order of frequency, and that the first three are much more common than iritis. All agree that the onset is insidious, that the disease is one of great chronicity, and that the patient is subject to spontaneous remissions and exacerbations.

Etiology

Any number of etiologic factors have been thought to play a part in the cause of rosacea. Among them are focal infection,[15, 24] gastrointestinal disturbances,[19, 25, 26] emotional and nervous states,[27, 28] endocrine imbalance,[19, 29, 30, 31, 32, 33] lowered gastric acidity,[29, 29a, 34] vasodilation,[10, 35] external mechanical factors such as exposure to sun, cold, and wind,[1, 26, 29, 36] some disorder of the fifth nerve,[6, 7, 29] "vasomotor instability,"[14] a virus,[37] a parasite, demodex folliculorum,[37a, 37b] and most recently riboflavin or vitamin-B_2 deficiency.[12, 16] This latter theory developed following the original report by Bessey and Wolbach[38] on the development of corneal vascularization in rats placed on a riboflavin-deficient diet.

Riboflavin is a fluorescent substance that was formerly a part of the vitamin-B complex but has recently been prepared in the pure form. It is now known as vitamin B_2 and occurs widely in foods and especially in milk, eggs, and liver. Riboflavin combines with phosphoric acid to form an ester that unites with various body proteins to form Warburg's yellow respiratory enzyme.[39] This enzyme is an important factor in tissue respiration and is thought to be especially important in the case of an avascular tissue such as

the cornea. The theory has been proposed that due to a riboflavin deficiency, the corneal tissues become anoxic and the corneal blood vessels come in from the limbus to aid in supplying oxygen.[12] Remarkable cures of rosacea keratitis have been reported[12, 16] as a result of therapy with 1 to 2 mg. or riboflavin administered intravenously for six to eight days, followed by oral doses of 5 to 20 mg. daily as the individual case requires. The usual cure is effected in from 6 to 18 days.

Much has recently been written, especially from the Southern clinics, on the syndrome of pure riboflavin deficiency[40, 41, 42, 43, 44, 45, 46, 47] in man. As well as can be judged from this work, the syndrome consists of nervousness, irritability, anorexia, gastric discomfort, fatigue, cheilosis with soreness of the lips, violaceous sore tongue with atrophic papillae, nasolabial seborrhea, comedones on forehead, malar eminences, nose, and chin, and the following ocular signs and symptoms: photophobia, burning, itching, "eye strain," poor distance vision, "spastic" mydriasis of the pupil, pigment deposits on the iris, and last but not least, and one of the earliest of all signs, superficial corneal vascularization followed later by deeper vascularization and still later by corneal opacities.

Material

The present study of rosacea was undertaken primarily for the purpose of evaluating these etiologic possibilities and in particular to confirm or disprove the theory that rosacea is due to a vitamin-B_2 deficiency. Available for study were 30 cases of facial and ocular rosacea; and 30 unselected cases of facial rosacea which were referred from the dermatology clinic and in which there were no previous nor present ocular complaints. The cases referred from the dermatology clinic were examined only once. The others were seen at intervals varying from daily to several months, over a period of two years. The following data were obtained from this series of 60 cases.

Age. The ages of all patients fell between 21 and 71 years. Of the whole group, seven gave a history of onset in their late teens; many more were affected in their twenties. Thus they appeared to fall into a younger age group than would have been anticipated from previous writings.

Sex. There were 39 women and 21 men in the series. However, among the 30 who had ocular rosacea, the sexes were about evenly divided. Most reports have indicated a somewhat higher incidence among women than men, but the difference scarcely appears to be sufficient to be of any real importance.

Race. The only racial factor noted was that none of the cases in the series occurred in a Negro. Rulison,[48] in an analysis of 135 cases of rosacea, reported several cases in very dark individuals and one in a Negro. With this exception, there have been no reports in the literature of the occurrence of this disease in the Negro race. Rulison does not state whether his patient was a pure-blood Negro or not. This racial factor does seem definite enough to be of some significance.

Contributing data

Type of onset. The onset was invariably insidious. Patients often had difficulty in saying exactly when the disease started. In the entire group there was no case in which the ocular rosacea appeared before the facial rosacea. The eye complications followed the facial trouble by an interval varying from a few months to as long as 30 years.

Digestion. So much has been written on the part played by digestive disturbances in the etiology of rosacea that a

very careful history of the digestion was taken in all cases. Eighteen patients stated that their digestion was excellent and that they could eat whatever they chose without incurring symptoms. Others gave histories of various gastrointestinal disturbances such as gas, fullness after meals, sour eructions, heart burn, constipation, nausea, vomiting, diarrhea, abdominal cramps, belching, "mucous colitis," and the like. Some at first stated that certain foods caused their faces to "break out," but when closely questioned it was discovered that these foods were also often eaten with impunity. Some had definite food allergies, but no food in any case was reported to activate the rosacea invariably. Several had even followed rather strict diets, eliminating all possible offending agents, without obtaining a permanent cure.

A moderate number of patients stated that when they ate too much or too rapidly, or took liquor in any form, or drank hot drinks their faces became redder and flushed. This, however, seemed to be only a transient phenomenon, passing off in a few hours.

Thus, digestive disturbances did not appear to be of primary etiologic importance in rosacea. Reyn's[1] finding of only 2 cases of rosacea among 595 patients with various gastrointestinal diseases supports this opinion.

Menses and pregnancy. Endocrine disorders have been rather loosely referred to in the literature as important in the etiology of this disease. Among these, ovarian activity in women has been especally stressed. For this reason the menstrual histories of all female patients as well as their pregnancy records were carefully examined. Some had irregular periods with varying degrees of dysmenorrhea, whereas others had regular and normal periods. Of the 39 women, 22 had regular normal periods which had no effect on the rosacea, 9 claimed the rosacea was worse just before or at the time of the period, 3 stated that their rosacea improved at the time of their periods, and in the remaining 5 the onset of the rosacea was after the menopause. Of the 13 women who had had one or more pregnancies during the course of their rosacea, 2 attributed the onset of the rosacea to pregnancy, 9 stated that pregnancies had no effect, 1 was made worse by her pregnancy, and 1 was completely free of all signs and symptoms of rosacea during her only pregnancy.

Thus, in summary, no very definite nor regular part was considered to be played either by the menses or by pregnancy in rosacea.

Emotional factors. It is difficult to evaluate the emotional factors at play in any individual who is seen only once and then perhaps for only an hour and a half. However, certain of these patients were seen frequently enough for the examiner to become rather well acquainted with them. Some of them were emotional, easily upset, and worried a great deal; but of the whole group only 10 patients felt that their emotional status had any effect on the rosacea. Others were as placid and unemotional as any average person could be, and several would even be classed as stoics. In an overall evaluation, it appeared that whereas emotional factors may have aggravated certain cases, these same emotional factors could not be incriminated as the primary etiologic agent in rosacea.

General health. Some writers would have one believe that the average rosacea patient is a semi-invalid. An example of this is in Rulison's[48] description of the average rosacea patent as one with ". . . a neurotic tendency, faulty posture, subnormal weight, low blood pressure, poor muscular tone, visceroptosis, chronic constipation, spasticity of the large bowel,

and gastric subacidity." The rosacea patients in this series would certainly not fit into any such category. They represented an average cross section of any adult clinic group. Many stated that aside from their ocular symptoms and the cosmetic blemish, they were in excellent general health.

A complete medical history and physical examination, with special studies when indicated, was made on 20 of the 30 patients who had ocular rosacea. No definite etiologic factor was uncovered in any of these, nor was any one defect or group of defects found consistently.

Exacerbating factors. All patients were asked the question: What seems to you to make your eyes or your face worse?

The majority simply answered that they did not know. In the main, however, most agreed that exposure to wind, cold, or sun, eating too much or too rapidly, or drinking hot beverages or alcoholic drinks usually made them transiently worse.

Incidence of styes and chalazia. Styes and chalazia were found more frequently in the patients who had rosacea blepharitis than one would have expected to find in an average group of patients suffering from ocular disturbance. Of the 30 cases of rosacea blepharitis, 18 patients said that styes, and 12 that chalazia had appeared following the onset of the rosacea. Several had multiple and repeated chalazia or "crops" of styes. The association of chalazia with ocular rosacea has been mentioned frequently in the past, and the findings here bear out the truth of this observation.

What has given most improvement? In answer to this question, the majority of patients stated that nothing had been of any permanent benefit to them. Some stated that X-ray therapy or a sulphurated potassium zinc solution used in the dermatology clinic had given the face more relief than anything else. As regards the ocular complications, a 1-percent solution of silver nitrate and adrenalin seemed to have given more temporary relief, and 5-percent sulfathiazole ointment more prolonged relief than any other medicament. Almost any new form of treatment usually gave some relief for a short time and then appeared to be without effect. Among these measures were local applications of copper sulphate, brilliant green, oxycyanide of mercury 1:5,000, yellow-oxide-of-mercury ointment, boric-acid eye wash, zinc sulphate 0.25 percent, border rays, holocaine ointment, and 2.5-percent ammoniated mercury ointment; dilute HCl taken by mouth and courses of staphylococcus toxoid and injections of tuberculin.

Focal infection. Focal infection, so often a vague factor, has recently been accused of having some part in the etiology of any number of unrelated diseases. Among these is rosacea. Some of the patients in this group undoubtedly had focal infections. Certain of these had had all foci removed, as far as was possible, without, however, experiencing a notable change in the rosacea. Some seemed to improve transiently after removal of such foci, others appeared to become worse, and one or two even had had flares at the time of removal of infected teeth, suggesting that some role was being played in the disease by the focus. However, in an overall evaluation, the possibility that focal infection could be important in the etiology of rosacea was thought to be remote.

Riboflavin deficiency. All patients were examined for evidence of riboflavin deficiency according to the criterion previously established for this syndrome in man. Two showed cheilosis, three gave a questionable history of fissuring at the angles of the mouth, five showed mild nasolabial seborrhea, and one or two patients had scattered comedones about the forehead and cheeks. Not one patient showed the glossitis of riboflavin defi-

ciency; not one the pupillary changes nor the iris-pigment changes stated to be a part of the syndrome of riboflavin deficiency. The vaguer symptoms of anorexia, nervousness, irritability, fatigue, and the like, were not considered sufficiently specific to warrant their inclusion here. Indeed, the comedones and nasolabial seborrhea in the degree seen here were undoubtedly nonspecific for riboflavin deficiency. Thus in this entire group, aside from corneal signs and symptoms, only two patients showed real evidence of anything that could be construed as due to deficient riboflavin. These two will be discussed later.

Blushing. Because of the vascular nature of this disease and because the lesions of rosacea occupy mainly that portion of the face which takes part in flushing and blushing—the so-called blush area of the face—the question of blushing was discussed with each individual. Several volunteered the information that they had always blushed more easily than their brothers or sisters. Others colored markedly simply on being asked this question. This factor of blushing (as shown below) was definitely higher than would be anticipated in any normal group, and its significance will be considered later.

Number of patients	60
Average or no blushing	16
Excessive blushing	44
As a child only	5
Now only	5
Both as a child and now	34
Blushed sufficiently to be teased	16

Family history. A family history of rosacea was found in only one patient of this series. This was not considered significant.

Relation between face and eyes. In all instances of ocular rosacea facial rosacea was also present, whereas many cases of facial rosacea were unassociated with ocular involvement. In some patients there had been facial rosacea for years without ocular complication, whereas others had developed ocular rosacea within several months of the onset of the facial disease. In the severest case of facial rosacea seen, there was no ocular involvement, not even a mild rosacea blepharitis. Other patients had moderately severe rosacea keratitis with relatively mild facial rosacea. In some cases both facial and ocular rosacea became better and worse together. In others this was not true.

Thus, no hard-and-fast rule was found to govern the relationship between facial and ocular rosacea except that the ocular disease followed the facial disease in all cases.

Gastric analyses. Based originally on the preliminary report of a series of 12 cases examined by Ryle and Barber,[49] the impression has been spread that the majority of rosacea patients have a low gastric acidity. Subsequent work has shown this to be not true. Brown[50] made gastric analyses on 200 rosacea patients and found that only 28 percent had hypochlorhydria or achlorhydria as compared to 35 percent in 216 cases of dermatoses other than rosacea. In the rosacea group two patients with very severe rosacea had normal gastric-acidity curves, whereas some of the achlorhydric patients had a very mild case of rosacea.

In an investigation of the gastric functions in chronic arthritis and fibrositis, Miller and Smith,[51] using the oatmeal-gruel test meal, found achlorhydria in an even greater percentage of cases than did Brown in his rosacea group.

	Percent
Achlorhydria	22
Hypochlorhydria	7
Normal acidity	61
Hyperacidity	10
Total	100

In a breakdown of Bell's[52] figures on 429 consecutive gastric analysis made by the fractional method, omitting all cases of ulcers, gastric cancer, hepatic disease,

primary anemia, and the like and using only those in which there was no known alteration in the gastric acidity associated with the diagnosis made one obtains the following figures:

	Number of cases	*Percent*
Achlorhydria	19	11.4
Hypochlorhydria	26	15.7
Normal	87	52.4
Hyperchlorhydria	34	20.5
Total	166	100.0

Thus it is quickly seen that the presence of a lowered gastric acidity is neither specific for rosacea nor nearly so frequent in rosacea as it is generally thought to be, but is more or less an incidental occurrence. The results of tests* on 17 of the patients in this series confirms this view.

Hyperchlorhydria	4
Normal	10
Hypochlorhydria	3
Achlorhydria	0
Total	17

Circumoral region. The so-called circumoral region of the face is spared as a rule in lupus erythematosus, diffuse telangiectasis of the face, emotional flushing and blushing, and in fevers—the circumoral pallor of scarlet fever being an excellent example of the latter.[53] Lewis and Harmer[53] noted that in one case of purpura simplex, in which, following a vomiting spell, petechial hemorrhages developed in the blush area of the face, the vessels of the circumoral region and other cutaneous vessels of the head remained intact. It thus seems that the minute surface vessels in the circumoral region, in contradistinction to those of the blush area of the face, have some inherent resistance to dilatation. It seems significant that of the 60 rosacea patients examined only 6 had any involvement in this region and in these the involvement was quite mild—as a rule, no more than an occasional papule or a small patch of erythema. In some of the cases manifesting a very diffuse facial involvement there was absolute sparing of the circumoral region.

* A fasting expression with histamine was the method used.

Ocular findings

Conjunctival scrapings. Conjunctival scrapings from the lower palpebral conjunctiva were taken from all patients both with and without evidence of ocular rosacea. They showed no cellular inclusions, no eosinophilia; in fact, nothing whatsoever specific for the disease. In the specimens from some of the patients who had ocular rosacea a few more polymorphonuclear cells than usual were found, an increased keratinization of the epithelial cells, and an occasional microorganism. On the whole, this study revealed nothing of interest.

Corneal sensitivity. Verhoeff,[6, 7] in observing that rosacea was usually limited in distribution to the region supplied by the fifth nerve, suggested that the disease might be due to some agent acting on the gasserian ganglion. Although in none of his cases was there a reduction in corneal sensitivity, several responded favorably to section of the nerves supplying the outer cornea, by removal of a strip of conjunctiva just beyond the limbus.

The corneal sensitivity was investigated in all patients of this series, and in only one—a man who had band keratitis—was there any diminution. This would seem to indicate that there is no neurotrophic element in ocular rosacea. However, Verhoeff's idea that noxious stimuli might pass down the fifth nerve antidromically, is not excluded by the finding of normal corneal sensitivity in this series.

Bacteriology. Cultures from the con-

junctiva of the lower cul-de-sac and from the lower-lid margin were made at least once in all cases, and many times in most of the cases of ocular rosacea. These cultures were plated on blood agar and phenol red mannitol agar[54] in each instance and were read in 48 hours.

As a control, similar cultures were made from 200 patients whose conjunctivas and lid margins were normal. Patients applying for the first time to the eye out-patient department were selected for this group. A careful history was taken to rule out any external disease and any symptom of possible external disease (including sac infection or nasolacrimal obstruction) over the period of the preceding five years. All who had negative histories were then examined, and the lids and conjunctivas of only those patients whose histories were negative and whose eyes were normal upon examination (no hyperemia, follicles, secretion, chalazia, lid-margin scales and such complications) were cultured as controls. Patients whose histories or examination was doubtful were discarded.

The 260 patients were divided into three groups: (1) 200 normal controls, (2) 22 patients who had facial rosacea but no ocular rosacea, and (3) 38 patients having both facial and ocular rosacea. The results from cultures were also divided into three groups: (a) positive, if they contained pathogenic organisms; (b) doubtful, if there were no colonies of pathogenic organisms in the conjunctival cultures and no more than two such colonies in the cultures from the lid margins; and (c) negative, if there were only colonies of nonpathogenic organisms. The results are tabulated below:

With the exception of one culture from the control group, which showed both pneumococci and influenza organisms, all positive or doubtful cultures were due to the Staphylococcus, and by far the majority of these to Staphylococcus aureus. The increase in the presence of pathogenic staphylococci in rosacea is obvious.

The ocular-rosacea cases in which cultures were positive showed a thicker, purulent secretion, and the patients in these cases had more irritative symptoms. Their lids were frequently adherent in the morning; their corneas were more prone to show both superficial punctate staining and marginal catarrhal infiltrates or ulcers of a type identical with those seen in staphylococcic infections. The faces of this group were also much more frequently secondarily infected with staphylococci, showing pustules, and in several cases a mild "matting" of infected, crusted exudate, teeming with staphylococci distributed over the cheeks, nose, forehead, or chin.

On the other hand, patients whose cultures were negative, had a thin, watery, nonpurulent discharge, and a dry, scaly, lid-margin lesion that did not cause the lids to adhere in the morning. Superficial punctate staining of the cornea was usually absent, even in some who had a marked keratitis; but when present this was usually very mild. The marginal catarrhal ulcers were not seen in this group, nor did their faces manifest significant secondary infection, showing either no pustules or only an occasional one, and in no instance a "matted" exudate.

Cases in which cultures were positive were likely to present ocular and facial

Cases	*Negative*	*Doubtful*	*Positive*
200 controls	91.5%	4.0%	4.5%
22 facial rosaceas only	68.2%	9.1%	22.7%
38 facial and ocular rosaceas	31.6%	7.9%	60.5%

signs and symptoms common in staphylococcic infections, whereas those in which cultures were negative showed no such tendency. This was definite and was thought to be an observation not given its deserved importance in the past. It will be discussed later.

Frequency of ocular complications. No estimate of the relative frequency of ocular complications in rosacea can be made from this study. Patients without severe ocular complications usually went to the dermatologist, whereas those with severe ocular troubles frequently first consulted the ophthalmologist. For this reason it will be difficult ever to determine accurately the relative frequency of ocular complications in rosacea. Certain general deductions may be drawn, however.

TABLE 1
FREQUENCY OF TYPES OF OCULAR ROSACEA

Types	Cases from Dermatology O.-P. D.	Cases from Eye O.-P. D.
No ocular rosacea	19	0
Chalazia	2	4
Blepharitis	5	28
Conjunctivitis	5	24
Keratitis	8	20
Iritis	0	2
Total number of cases	30	30

Blepharitis was the most frequent ocular complication. A mild conjunctivitis was usually associated with it, especially involving the palpebral conjunctiva of the lower lid. Keratitis was less frequently found and was present often in a very mild form. Iritis was distinctly rare and occurred in cases included in this series only when there was a severe keratitis with ulceration and secondary infection.

Table 1 gives some idea of the relative frequency of the different types of ocular rosacea.

Riboflavin therapy.* The results of treating a group of 21 patients with riboflavin are summarized in table 2. At first oral therapy was used. Then, as results failed to appear, stronger and stronger intravenous therapy supplemented with oral therapy was employed. Finally, in a last effort, certain patients were given an oral supplement of B complex (Betaplexin Winthrop).†

All cases of ocular rosacea in this group were also diagnosed as cases of facial rosacea by a dermatology specialist. All showed rosacea keratitis with corneal vascularization. The results of the riboflavin therapy are obvious from the table and need no further comment.

Four cases deserve special mention:

Case 9. A woman, aged 39 years, had a more marked keratitis of the left eye than of the right, but had corneal vascularization in both. She also had trichiasis of the left lower lid, associated with more extensive corneal vascularization in the region scratched by the cilia. These cilia were epilated before riboflavin therapy was instituted. She did show improvement, but the corneal vessels never entirely disappeared nor appeared inactive. Later, after riboflavin had been withheld and when the cilia were again scratching the cornea, epilation alone effected the same improvement that was observed before from combined riboflavin therapy and epilation. Thus it appeared that riboflavin was truly of no benefit to this patient.

* All riboflavin used in this study was supplied by Merck. It was prepared fresh every two days by dissolving in sterile water in a water bath (20 minutes). While awaiting injection all preparations were kept in the dark.

† All Betaplexin used in this study was supplied by Winthrop. Each teaspoonful (5 c.c.) represented: 1.5 mg. B_1, 600 gammas (240 S-B units) B_2, 675 gammas B_6, 9 mg. nicotinic acid, and 120 Jukes-Lepkovsky units of filtrate factor.

Case 14. A man, aged 52 years, had a definite rosacea flare on his twelfth day of receiving 10 mg. riboflavin intravenously daily. He had a cheilosis which cleared during the riboflavin therapy, although the rosacea was unimproved.

Case 19. A man, aged 32 years, was the only patient who had a reduction of symptoms and a decrease in the signs of his rosacea. Neither the activity of the rosacea nor the corneal vascularization entirely disappeared.

TABLE 2

RESULTS OF RIBOFLAVIN THERAPY

Case	Diagnosis	Daily Dosage of Riboflavin	Result
1 M. V.	Blepharo-conjuncto-keratitis	6 mg. riboflavin by mouth for 4 wks.	No improvement
2 M. O.	Blepharo-conjuncto-keratitis and iritis	Same	Same
3 T. B.	Blepharo-conjuncto-keratitis	6 mg. riboflavin by mouth for 8 wks.	Same
4 J. L.	Blepharo-conjuncto-keratitis	1 mg. I.V. for 2 wks., followed by 6 mg. by mouth for 4 wks.	Same
5 E. M.	Same	5 mg. I.V. for 4 days (reaction), then 6 mg. by mouth for 4 wks.	Same
6 M. L.	Same	1 mg. I.V. for 1 wk., then 6 mg. by mouth for 9 wks.	Same
7 R. Z.	Same	10 mg. I.V. for 2 wks.	Same
8 F. J.	Same	Same	Same
9 B. K.	Blepharo-conjuncto-keratitis and trichiasis O.S.	Same	Questionable improvement
10 D. A.	Blepharo-conjuncto-keratitis	10 mg. I.V. for 2 wks., followed by 6 mg. by mouth for 6 wks.	No improvement
11 M. B.	Same	Same	Same
12 J. B.	Same	Same	Same
13 F. R.	Same	Same	Same
14 A. S.	Same	Same	Same
15 J. D.	Same and band keratitis	Same	Same
16 R. S.	Blepharo-conjuncto-keratitis	10 mg. I.V. for 2 wks., and 6 teasp. betaplexin by mouth for same 2 wks., followed by 20 mg. riboflavin by mouth for 4 wks. more	No improvement
17 J. A.	Same	Same	Same
18 L. K.	Same	Same	Same
19 J. S.	Same	Same	Questionable improvement
20 W. S.	Same	Same	No improvement
21 C. K.	Same	Same	Same

Case 15. A man, aged 41 years, had an exacerbation of his rosacea after his fourth daily intravenous injection of 10 mg. riboflavin. Later he developed a cheilosis that responded to the ingestion of 20 mg. riboflavin daily. During this oral riboflavin therapy there was a second flare in the rosacea. The cheilosis was cured and the rosacea unchanged by this course of riboflavin.

EXPERIMENTAL STUDY

Meyer and Palmer[55] in 1934 first reported the presence of hyaluronic acid in the vitreous humor. Later this substance was recovered from aqueous,[56] umbilical cord,[57] synovial fluid,[58] and the cornea,[59] but not from blood[56] nor sclera.[59] The fact that this substance was present in these avascular tissues and appeared to be absent in vascular struc-

tures; the fact that hyaline cartilage, which is also blood-vessel free, contains a similar carbohydrate sulphuric-acid ester; and the fact that the intracorneal injection of hyaluronidase caused corneal vascularization, whereas the injection of inactivated enzyme in most instances caused only transient reactions, led Meyer and Chaffee[59] to believe that hyaluronic acid might be a factor in preventing corneal vascularization.

Because of the disappointing results in the treatment of the corneal vascularization of rosacea keratitis with riboflavin, and because riboflavin-deficient rats were known to develop vascularization of the cornea,[38] it was thought that a study of normal and vascularized rat cornea to determine the presence of hyaluronic-acid ester would give a definite answer to the part played by this substance in maintaining the avascularity of the cornea.

Method. Thirty-two white rats, three weeks old, were individually housed in wire-bottom cages. Twenty of these were given the following B_2-deficient diet:

Casein, vitamin-free Harris	18%
Dextrose	68%
Salt mix, No. 1 (U.S.P.XI)	4%
Butterfat	8%
Cod-liver oil	2%
Addendum No. 10	500 c.c.

Addendum No. 10 contains:

Vitamin B_1	160 mg.
Vitamin B_6	160 mg.
Pantothenic acid	1 gm.
Choline chloride	20 gm.
Ethyl alcohol 95 percent up to	1,000 c.c.

Twelve animals were used as controls and given the above diet plus a daily dose of 20 $\propto$ B_2 by stomach tube. All animals were weighed daily. With the hand slit-lamp, the eyes of all animals were examined weekly for evidence of corneal vascularization.

The changes noted in the riboflavin-deficient animals are tabulated in the order of their occurrence below.

Change	*Time of appearance*
1. Presence of lice	By end of first week
2. Slowing or stopping of weight gain	First to second week
3. Roughening of the coat	Third to fifth week
4. First death	Thirty-first day
5. Development of conjunctivitis and development of porphyrin on whiskers	Sixth week
6. Corneal vascularization	Sixth to tenth week
7. Corneal opacity	Seventh to tenth week

None of the 12 control animals showed any change whatsoever. All grew and thrived and had normal, clear corneas.

Ten control animals were killed, five at the eighth and five at the tenth week of the experiment. Ten deficient animals showing corneal vascularization were killed at the time of the development of the vascularization in each case. Only one of the latter group had a clear cornea at the time of the corneal vascularization, the corneas of other rats being in various stages of opacity. The corneas were removed from all of the killed animals and placed in acetone. The nonvascularized control corneas were pooled, as were the vascularized B_2-deficient ones. Both groups were tested for the presence of hyaluronic acid by a method outlined by Meyer.[60] The results were as follows:

Hyaluronic acid contains one mole of acetyl glucosamine.

	Weight mg.	*Glucosamine* percent
Controls	17	0.75
Vascularized cornea	9	0.78

Percentage of glucosamine for other normal corneas:

Rabbit	1.2-1.5
Beef	1.7-1.8
Rat	0.7-0.8

From these results it appears that the presence of hyaluronic-acid ester in the cornea failed to prevent corneal vascularization.

Discussion

While most authors believe that facial rosacea is necessary to a diagnosis of ocular rosacea, there are some[12, 14, 61] who do not. Indeed, Pandelesco and Valdman[11] state that ocular rosacea is not a complication of facial rosacea but a distinct and independent disease. In the present series no diagnosis of ocular rosacea could have been made without the simultaneous presence of typical facial rosacea. Certainly rosacea keratitis offers nothing specific to warrant its diagnosis in the absence of facial rosacea.

In Johnson and Eckardt's report,[12] only 9 in their series of 36 patients who had rosacea keratitis exhibited facial rosacea. They believe* that facial rosacea is not at all necessary for the diagnosis of ocular rosacea. Further, they frequently see rosacea keratitis in Negroes. They observe that the condition, which we diagnose as marginal catarrhal ulcer, responds quickly to the parenteral injection of riboflavin and consider it possible that the accompanying conjunctivitis may locally have disturbed the enzyme activity of the limbus. They feel that most marginal catarrhal ulcers will in time subside spontaneously and that local treatment of the conjunctivitis will hasten recovery, but observe that the parenteral use of riboflavin will allow healing of the ulcer even before the conjunctivitis has healed. They contend that the corneal involvement in marginal catarrhal ulcers and rosacea keratitis is similar but differs chiefly in the extent to which the ulcer progresses before spontaneous recovery will occur.

In any chronic disease such as rosacea, in which spontaneous remissions are frequent, great care must be taken in giving credit to any therapeutic agent. The effect of such a curative agent should be prompt, definite, and regular. The results in the hypovitaminoses have usually been dramatic in this respect.

One patient in this series had a spontaneous remission from a severe facial and ocular rosacea (including keratitis and secondary staphylococcic infection) which lasted for six months. During this time the skin of her face was completely clear. There was no evidence of ocular rosacea, no corneal vascularization, and only an occasional faint peripheral corneal scar from previous marginal ulcers. All cultures during this remission were negative for pathogenic staphylococci. Indeed, the diagnosis of rosacea could not have been made during this period. Had this been an isolated case, one might easily have given credit for the "cure" to whatever was being used at the time of the remission. It is hard to believe that in a series of 28 cases of rosacea keratitis only 2 would show cheilosis and none the typical hyporiboflavinosis tongue lesion reported in this syndrome if the disease were due to a riboflavin deficiency. For this and the following reasons it was felt that rosacea keratitis was not due to a riboflavin deficiency:

1. Exacerbations of the disease occurred during intensive riboflavin administration in two cases.

2. Cure of the cheilosis was effected by riboflavin therapy without visible effect on the rosacea in either of two cases.

3. Spontaneous remissions occurred in several cases in the absence of any apparent change in diet or eating habits.

* Personal communication.

4. Treatment with riboflavin failed to effect a definite cure in any of a series of more than 20 cases of rosacea keratitis.

It is true that rosacea is less likely to occur in darkly pigmented individuals and is probably absent in the Negro race, but the explanation of this is wanting. The subject of pigmentation and its ramifications is much too broad to be included here, but it provokes interesting speculation.

The frequency and seriousness of secondary staphylococcic infections in ocular rosacea have been generally neglected. Several authors[5, 62, 63, 64] have drawn attention to the presence of pathogenic staphylococci in rosacea and Linser[65] even reported good results from the use of a staphylococcus vaccine in some of his cases. Others[10, 27] have mentioned the possibility that a secondary infection might be present in rosacea without, however, naming an organism. Most observers, indeed, have ignored the possibility of a secondary infection in cases of rosacea or have agreed with Verhoeff[7] that ". . . fortunately, the lesions (marginal infiltrates*) seldom become seriously infected with pyogenic organisms," or with Doggart[9] that ". . . several observers have emphasized the presence of staphylococci in the conjunctival sac, but it is doubtful whether these organisms play any greater part in rosacea than they do in phlyctenular disease."

From this study it appears that the initial lesion in rosacea keratitis is the extension of vessels over the limbus into the cornea. This is a superficial invasion at first. These small vessels are accompanied by an epithelial edema which to casual inspection appears as corneal cloudiness and may be confused with corneal infiltration, proceeding directly from the limbus. It is followed by further extension of vessels, enlargement of those already present, and the development of a regional infiltration. This process moves forward toward the corneal center at a speed dependent on the severity of the process and the frequency of remissions. If severe, a mild superficial punctate staining of the cornea may also be present. The usual symptoms of tearing, photophobia, and the presence of injection and of a thin watery discharge are noted. This process is frequently more marked in one eye than in the other. It may be absent in one eye if not marked in the other, but if at all severe in either eye, it can usually be found in both.

This picture of the early development of rosacea keratitis is almost always confused by the presence of pathogenic staphylococci and their sequelae. The two most frequent accompaniments of pathogenic staphylococci are the increased superficial punctate staining of the cornea and the development of scattered or single marginal infiltrates. These begin as subepithelial areas of cloudiness occurring in the region of the arcus senilis and always separated from the limbus by a narrow clear zone. The epithelium over them becomes roughened and they later become denuded and stain as a true marginal corneal ulcer. By this time or even before, new blood vessels leave the limbus and approach the ulcer or the infiltrate if it has not yet ulcerated. Associated with this is an increased localized, regional ciliary injection. Whether the infiltrates occur in regions already slightly invaded by blood vessels or in some region where blood vessels have not yet extended beyond the limbus, the process is essentially the same. After the vessels have reached the infiltrate, it usually begins to clear and ordinarily heals in 6 to 14 days leaving a small faint scar in the region it formerly occupied. The vessels which previously supplied this area

* Parentheses mine.

decrease in size or may entirely disappear, and the regional ciliary injection subsides. If staphylococci persist, the process is repeated in some other portion of the cornea or frequently in the same sector as the original lesion. If the recurrence is of the latter type, the new lesion is usually situated nearer the center of the cornea with a narrow intervening area of clear cornea as with the original lesion. There is no explanation for this so-called "free zone" in the development of these infiltrates. In the more severe cases, as the infiltrates spread toward the corneal center in a "tonguelike" fashion, some of the original scars may break down, and deeper infiltration and scarring together with increased vascularization may occur. These changes, resulting probably from the secondary infection, may be the cause of the so-called tonguelike or sector-shaped lesions so frequently mentioned in the literature on ocular rosacea. Associated with these processes is a marked increase in the superficial punctate staining of the cornea and the usual train of signs and symptoms of the infection, such as increased irritation, burning, foreign-body sensations, adherence of the lids in the morning, and the presence of a thicker purulent discharge together with crusting of the lid margins.

No specific rosacea iritis was noted in any of the cases in this series, but in two a nonspecific iritis did occur. In both of these it was undoubtedly secondary to the severely ulcerated and infected cornea, and consisted of a slight miosis of the pupil, with dilatation of the iris vessels and the development of a dusky iris color. There were cells and increased flare in the anterior chamber in both cases but no K.P. In both cases also the pupils were dilated easily. There were no synechiae. Neither nodules nor new-vessel formations were observed in any iris.

In this entire group of cases, not one marginal infiltrate of the type previously described, or of the type identical to those known to be induced by the Staphylococcus, developed in the absence of pathogenic staphylococci. In some of the quieter cases, in which there were mild corneal vascularization and scars of old healed marginal ulcers, negative cultures did occur, but in none of these did an active marginal infiltrate develop.

Thus it would seem that if the secondary infection could be controlled, corneal scarring incidental to staphylococcic ulcers with its effect on visual acuity and all of its disagreeable symptoms could be prevented. By treating the staphylococcic infections occurring in this series with either 5-percent sulfathiazole or 5-percent sulfadiazine* ointment locally, several times daily, the infection could practically always be controlled even if not cured. Once it was controlled, the patients were permitted to use the ointment prophylactically as they desired. By applying it freely when symptoms first recurred they were usually able to "quiet" the eyes in 24 to 36 hours. It was gratifying to see how much more comfortable patients having ocular rosacea with secondary infection were made by controlling the infection even though the rosacea persisted. Further, if secondary infection and its sequelae can be eliminated in rosacea of the eye, then the worst symptoms and most distressing visual losses can be controlled. This does not apply to those actively fulminating cases of corneal rosacea which lead to severe symptoms and considerable visual loss even in the absence of pathogenic staphylococci. That such cases are rare is evidenced by the fact that there were only two in this series.

How can one know that these marginal

* Sulfadiazine was used if sensitivity or irritation resulted from sulfathiazole. It was equally efficacious.

infiltrates result from the pathogenic staphylococci cultured from the conjunctival cul-de-sac? If they result from an exogenous source, why are they first subepithelial, having an intact epithelium overlying them? And why do they occur so regularly and consistently in this relation to the limbus (in the zone of the arcus senilis)?

These questions are difficult to answer. As to the first, it can be said with assurance that clinically identical lesions have been shown to result from staphylococcic infections. Further, pathogenic staphylococci were present in all cases in this series in which such active infiltrates appeared, and in no case was such an active infiltrate seen in the absence of a positive culture. Patients who used the sulfathiazole or sulfadiazine regularly, and as directed, became free of such infiltrates, though they may have been prone to develop them before. Also, the incidence of styes, known to result from the Staphylococcus, was higher in these than in normal patients, thus showing the activity of this organism. These considerations while not proof, make the supposition highly probable.

It is equally probable that if these infiltrates are due to the staphylococci they represent a response to staphylococcus toxin. It is known that such toxins from a corneal ulcer can penetrate Descemet's membrane and the endothelium, and can enter the anterior chamber to set up an active iritis with a sterile hypopyon. Now if these toxins are able to do this, is it not reasonable to suppose that they might pass through the epithelium in a similar manner? The epithelial barrier must be definitely broken before staining with fluorescein occurs. It is conceivable that this barrier may be sufficiently broken to permit the passage of the toxins to the subepithelial spaces before the break reaches a stage where staining would occur. Thus the infiltrates might well be due to an exogenous factor while appearing to be due to an endogenous one.

The cornea, being an avascular structure, must have a resistance built on some mechanism aside from the direct activity of the blood stream, whereas most of the other tissues of the body depend for their resistance on factors in or connected with the blood stream. This is certainly true of that portion of the limbus where the fine vascular loops end. Between this point and the center of the cornea there must be some alteration in the mechanism of resistance. Two anatomic examples of this are Bowman's and Descemet's membranes, which originate at the limbus. It follows that a site just beyond the influence of the vascular loops at the limbus and not sufficiently into the cornea to meet its fully developed specialized resistance may be the point of least resistance and the point most easily attacked by invading processes. This is the only explanation which can be offered as to why the infiltrates regularly occur in the zone of the arcus senilis.

Ocular and facial rosacea are manifestations of one and the same disease whose etiology is at present unknown. Why one patient may have a marked facial rosacea, another a mainly ocular involvement, and a third a rhinophyma is at present unanswerable. The distribution of rosacea, however, does offer an interesting speculation as to its etiology.

Such factors as eating too rapidly, exposure to cold, wind, or sun, the drinking of hot or alcoholic stimulants, and the like, tend in all of us to promote facial flushing. These same factors in rosacea patients bring on intense facial flushing, possibly even transiently aggravating the rosacea but certainly not being funda-

mentally causative. The fact that such a high percentage of rosacea patients blushed easily both in childhood and at the present time would fit in very closely with this observation, for the so-called blush area and the area of flushing due to these various causes are one and the same. All of this, as well as the coincident sparing of the circumoral region in lupus, rosacea, fevers, and so forth, as previously mentioned, supports the view that the vascular tone of the vessels in the blush area is lower than that of the circumoral region of the face and other areas of the general integument. Further, the clinical reactions of rosacea patients point to the fact that the vascular tonus of their blush area is lower than is the vascular tonus of the same area in normal people. Experimentally Harmer and Harris[66] obtained a flush of the skin in every instance after giving human subjects histamine by subcutaneous or intravenous injection. Interestingly enough, the flush appeared to be most marked in the exposed regions (blush area), being sharply limited at the neck by the collar line in men and by the V-shaped mark of exposure on the neck and upper chest in some women. They believe that the vessels of the regions that gave the most marked response had a lower capillary tone than those of the rest of the body.

Another bit of clinical evidence pointing toward the lability of the vasodilator mechanism in cases of ocular rosacea was shown by the aforedescribed patient in case 9 who had trichiasis, and in several other rosacea cases with foreign-body involvement. In all of these, minute traumata stirred up a relatively intense reaction associated with marked vasodilation. Simple manipulation incident to examination frequently caused quiescent rosacea eyes to flush transiently. Postoperative cataract patients who have rosacea invariably have a much redder eye than has the average such patient. All of these observations point to a labile vasodilator mechanism.

Thus, it is suggested that rosacea is due to some factor, at present unknown, that produces prolonged vasodilatation of the superficial vessels in the so-called blush area. The papules and sebaceous hypertrophy probably are secondary to the congestion in this region incident to the prolonged vasodilatation. The pustules of the face and the infectious ocular changes undoubtedly are entirely secondary and play no part in the fundamental cause of rosacea. Teliangectasia occurs when the vessels' contractile power is finally completely exhausted. This does not explain the new-vessel formation in the cornea, but the latter appears to be a reasonable response by an avascular tissue to some unknown stimulus that causes an increase in the vascular bed of a vascular tissue through vasodilatation.

Miller,[35] in an excellent article, discusses some of the possible nervous pathways affecting vasodilatation of the face. It is known that nerve impulses pass more easily over a given pathway following each successive passage. In this way some individuals having an inherently labile tonus of the facial blood vessels would, through repeated blushing, flushing after meals, and the like, increase the ease with which impulses could pass over this course. Miller also mentions the interesting possibility of overflow of afferent impulses to the brain along such a path of least resistance. Possibly the fifth nerve has a lower threshold for eliciting a response than have other nerves, and for this reason is more often stimulated to activity.

Numerous other authors[14, 17, 26, 29] have stressed this vasomotor factor, Eastwood[67] wondering ". . . whether rosacea

is an end result of an abnormal response to a natural stimulus," and Verhoeff[6] suggesting that ". . . possibly noxious agents act on the gasserian ganglion, which sets up stimuli which pass back down the nerve and cause the lesion at its termination."

At any rate, vasodilatation of the facial vessels, whether brought about by impulses passing via the fifth nerve, the cervical sympathetic, or some vasoconstrictor or vasodilator "center" in the brain stem, is a very complex and little-understood mechanism at this time. It would be most interesting to see the effect on rosacea of interrupting the vasodilator pathway to the blush area of the face, if this could be done.

Conclusions

1. Ocular rosacea occurs following facial rosacea and both are manifestations of the same disease.

2. At present the fundamental cause of rosacea is unknown.

3. Rosacea is not a manifestation of riboflavin deficiency.

4. Previously considered causes of rosacea, such as gastrointestinal disturbances, focal infection, endocrine and other disorders are not fundamental etiologically, but in some cases may be transient aggravating factors.

5. Rosacea probably does not occur in the Negro race.

6. Lowered gastric acidity is neither specific for rosacea nor nearly so frequent an accompaniment of it as has previously been thought. Its presence is of no special significance.

7. Hyaluronic ester is not decreased in the cornea of the rat that has become vascularized due to riboflavin deficiency.

8. The importance of secondary infection in cases of ocular rosacea has been neglected in the past.

9. Except in the unusual and rare cases of severe ocular rosacea without secondary infection, most of the distressing symptoms and sequelae of ocular rosacea are due to secondary infection with staphylococci.

10. The secondary infection in ocular rosacea can be controlled in almost all cases with 5-percent sulfathiazole or sulfadiazine ointment, used locally several times daily.

11. Rosacea probably is due to some factor causing vasodilatation in the facial area.

I wish to express appreciation of the help given by Dr. Phillips Thygeson throughout this study; of the help given with all of the culture work by Miss Nancy Roberts; of the help given in translation by Drs. Devorah Khorazo, Ludwig von Sallmann, and Edward Gallardo; of the help given by Miss Eleanor Chaffee in the chemical analyses of the cornea for hyaluronic ester; and of the assistance given by Merck Company in the care and preparation of the riboflavin-deficient animals.

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NOTES, CASES, INSTRUMENTS

ON VERTICAL DUCTIONS

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In the September, 1942, issue of the Journal, in the article, entitled "Visual problems," the authors speak of supraduction and infraduction of the right eye as something different from supraduction and infraduction of the left eye. In fact, table 10 gives different values for these findings. The authors do not speak of right and left adduction or right and left abduction, but simply of adduction and abduction. That is, whether the prisms are placed entirely before each eye, or preferably split between the two eyes, the amount of prisms, *base out,* over either or both eyes measures the total adduction, and similarly the amount of prism, base in, over either or both eyes measures the amount of abduction. Is it not exactly the same thing in the so-called "supraduction" and "infraduction"?

In adduction and abduction we measure the driving force, call it fusion power, which makes both eyes turn in *opposite* directions in order to maintain single binocular vision for the break point, and single binocular, clear, vision for the blur point. Both eyes may actually turn behind the prisms; or one eye only may turn, the other being prevented from active turning by an opposing version innervation. But even here the innervations are binocular and exactly equal.

In testing "right supraduction" by a prism, base down, before the right eye, there must be a corresponding innervation sent to the depressors of the left eye to hold it down, thus preventing it from following the right eye upward. This is the innervation that produces "left infraduction." Similarly, in measuring "right infraduction" by a prism, base up, before the right eye, there must be a corresponding innervation sent to the elevators of the left eye to hold it *up,* thus preventing it from following the right eye downward. This is the innervation that produces "left supraduction." The same thing applies to measurements by prisms of "left supraduction" and "left infraduction." In a word, the vertical ductions like the horizontal ductions test the binocular responses to movements in *opposite* directions. The vertical ductions measure the power of, say, the right eye to go *above* the left and at the same time the power of the left eye to go *below* the right. That is, right supraduction and left infraduction measure the same thing. Likewise, left supraduction and right infraduction measure the same thing. It is as if one's height were measured from top to toe or from toe to top. It would be best to drop the terms right and left supraduction and infraduction entirely. Bielschowsky, I think, calls these movements positive and negative vertical divergence. Perhaps a shorter term would be positive vertiduction for right supra- and left infraduction, and negative vertiduction for left supra- and right infraduction.

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REFRACTION CLINIC*

DISCUSSION BY ALBERT E. SLOANE, M.D.†
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Case 1

A man, aged 19 years, has been turned down as an apprentice machinist because of his eyes. He has never worn glasses, complained of no headaches, and

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† Director of Department of Refraction.

"never was a person who did much reading."

Examination: Vision O.D. and O.S. was 20/100; with a +4.50D. sph. ⊂⊃ −3.50D. cyl. ax. 90° = 20/30, vision corrected O.U. was 20/20.

Phorias: Distance, 9Δ esophoria (without glasses); 3Δ esophoria (with glasses). Near: 3Δ esophoria (without glasses); orthophoria (with glasses).

DISCUSSION

One first notes that for a person as young as this patient (19 years), who has an adequate amplitude of accommodation, the naked vision is fairly low. This is always the case when the astigmatism is against the rule. It is almost an axiom that of two patients with equal amounts of astigmatism except that it is with the rule in one and against the rule in the other, the naked vision will be poorer in the latter.

The second observation we make is that the corrected vision is merely 20/30 in each eye. This is best explained because the retina has not been accustomed to precise imaging and it is a sort of "clumsiness" of vision that is corrected when the glasses are worn. I have seen cases in which the full correction originally gave 20/70 vision, which, in a few months, came up to 20/20.

The third point to be noted is that without glasses there is 9 prism diopters of esophoria for distance and 3 prism diopters of esophoria at near. These represent limits that can usually be tolerated, but the fact that this esophoria is *materially reduced* by the glasses proves that it is due to an accommodative factor and can be neutralized by forcing the plus correction.

In the history given, there was no apparent difficulty with near vision, probably because the patient did not "go in for reading." Near vision in such cases usually becomes very tiresome even with an active accommodation. Let us assume the person looks at a letter made up of horizontal and vertical components. He may first see the vertical components clearly, and horizontal components are blurred. He immediately makes an effort to bring into focus the blurred horizontal elements and by doing this throws out of focus the vertical elements; again he tries to focus the vertical elements throwing out the horizontal. By rapidly changing the focus from vertical to horizontal he gets a clear composite picture, which, however, requires continuous focusing to maintain, and uses a considerable amount of effort. This extra effort fatigues him easily so that it may be difficult for him to concentrate on what he is doing. If he forces himself to see, the vision becomes blurred for a moment and clears when he squeezes or rubs or rests his eyes. Usually persons with such refractive condition do not attempt to read for any length of time.

It is noted that he has no headaches. It is paradoxical that people with large errors of this type may not have headaches in spite of obvious reasons for them. This fact may be explained, in some cases, on the basis that no attempt is made to see clearly if there is any difficulty. In others, there may be a constitutional explanation.

SOLUTION

In spite of the fact that glasses have never been worn, I would prescribe the full correction. It is known that *cylinders correcting against-the-rule astigmatism are tolerated* much more easily than cylinders with the rule. I should correct all the spherical hypermetropia because of its beneficial factor in neutralizing the esophoria.

QUESTIONS BY HOUSE OFFICERS

H. O.: If all other findings remained the same except that the cylinder was axis

180°, how much would you correct?

Dr. S.: Since cylinders correcting with-the-rule astigmatism are less easily tolerated than those for against-the-rule astigmatism, and since this man has never worn glasses before, I would probably prescribe a full sphere but give him three fourths of a diopter less cylinder, and then I would have the patient return in about one year and give him the full correction.

H. O.: Are such people ever satisfied with accepting the circle of least diffusion for near work?

Dr. S.: Yes. That is why many have no accommodative symptoms, but cannot see small objects precisely.

H. O.: Does the misjudgment of distance associated with full correction of astigmatism in people who have never worn glasses right itself or is it often necessary to reduce the astigmatic correction?

Dr. S.: Usually people will adjust themselves.

Case 2

A boy, aged 18 years, who has never worn glasses, complains that he can not see at a distance.

Examination: Vision was O.U. 5/200; with a −5.00D. sph. ⊂⊃ −1.00D. cyl. ax. 90° = 20/20 in each eye.

Phorias: Without glasses: 8$^{\Delta}$ exophoria (distance); 13$^{\Delta}$ exophoria (near). With glasses: 3$^{\Delta}$ exophoria (distance); 7$^{\Delta}$ exophoria (near).

DISCUSSION

One is immediately confronted with the question as to whether a full correction should be given, particularly in this situation, when no glasses have been worn before.

There are two factors which must be considered in this respect. The first, is the role of accommodation. The full myopic correction will make this boy emmetropic and will make it necessary for him to use accommodation to see at near distances, where formerly he had to use *no* accommodation. Thus, an effective measure might be to correct his myopia partially, thus improving his visual acuity over that without glasses, and yet leave him sufficiently myopic so that his accommodation will not be taxed. However, the fact that he is 18 years of age should make one realize that he is capable of utilizing his accommodation with much less difficulty than would an older person. One may state that up to the age of 30 years, most myopic persons will learn to tolerate a full correction that they have never worn before.

The second consideration relates to the effect on the existing heterophoria. A minus correction tends to neutralize an exophoria and increase an esophoria. This is due to the effect of accommodation on convergence. The corrected myopic eye must use more accommodation than when it is not corrected and this accommodation in turn tends to produce over convergence, which is (in another sense) esophoria. In a similar way, if the basic heterophoria is a convergence insufficiency (exophoria) the extra accommodative effort, which, in turn, stimulates convergence, tends to correct the exophoria. Thus, in the presence of exophoria one would be inclined to correct the myopia more fully and in the presence of esophoria, to undercorrect the myopia.

SOLUTION

Since the exophoria is somewhat great without glasses, I should tend to push the minus lens. The age of 18 years, with its abundance of accommodation, is another indication for not fearing adequately to correct with minus. I would be influenced by the nature of work that this person must do, and if distance vision is a requisite I would not hesitate to prescribe

the glasses as found. I would make these two reservations to the patient. First, it may be necessary to have a second pair of glasses (approximately −3.50D. sph. ⌯ −1.00D. cyl. ax. 90°) for close work later, if he cannot adapt himself to the full correction. Secondly, I would acquaint the patient with the fact that it will take a short time to get used to his glasses but that eventually they would serve all purposes.

QUESTIONS BY HOUSE OFFICERS

H. O.: Would not bifocals serve as all-purpose glasses in such a case?

Dr. S.: Theoretically, yes, but usually people under 30 years can bring up their accommodation so that no reading addition is necessary and *wherever a single-vision glass is adequate, avoid bifocals.*

H. O.: What if the exophoria remains the same for near?

Dr. S.: When the exophoria does not change at near with the minus correction, it is an indication that this exophoria may not be of the so-called accommodative convergence type. I have seen a number of patients who at first showed relatively little decrease in the exophoria when the glasses were first given, but who later were very much helped. I think it may work like certain accommodative squints which, in the first few months, show no straightening with glasses and then later display considerable effect.

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SOCIETY PROCEEDINGS

EDITED BY DR. RALPH H. MILLER

CHICAGO OPHTHALMOLOGICAL SOCIETY

December 15, 1941

DR. SANFORD GIFFORD, *president*

CLINICAL MEETING

(Presented by Department of Ophthalmology, University of Chicago)

INTERSTITIAL KERATITIS

DR. L. ALKOFF. A woman, aged 43 years, had been under observation for three years. When first seen she complained of redness of the right eye, photophobia, tearing, and severe pain of several weeks' duration. Vision had diminished markedly in the right eye. The past history was essentially negative except for the fact that she went through a normal menopause at the age of 30 years.

Vision at that time was R.E. 3/200; L.E. 1.0 + 2. There was marked circumcorneal injection, and many opacities of the cornea of the right eye were seen. The iris was edematous. There were corneal deposits or cells. With the slitlamp many brushlike blood vessels of the posterior surface of the cornea and posterior one third of the cornea were seen. Descemet's membrane was wrinkled.

The blood Wassermann test showed a 4+ reaction; the spinal Wassermann test was negative.

The patient remained under observation while treatment with heat, atropine, antisyphilitic therapy, and fever therapy continued for several months. The acute condition in the right eye subsided, except for some opaqueness of the cornea and innumerable deep vessels. The vision was unchanged. The patient remained on specific therapy for about a year and then stopped. About a year later she developed partial deafness in the left ear.

Seven weeks ago she returned to the clinic with the complaint of reddening of the left eye. Some edema of the cornea was noted, with circumcorneal injection; there were no corneal deposits, cells, nor blood vessels. The cornea of the right eye showed an old interstitial keratitis. The patient was placed under nonspecific treatment of heat and atropine. After three weeks, there was still pain, tearing, and photophobia. Ten to 20 cells were present. Sulfathiazole therapy was started.

When the patient was last seen the vision in the left eye was 0.5 − 2; much edema of the cornea and striae of Descemet's membrane were present. No vessels were observed, but there was moderate redness. She was placed under antileutic and fever therapy.

BILATERAL CONGENITAL TOTAL ANIRIDIA WITH BEGINNING CATARACTS

DR. WILLIAM ROSENBERG. A. E. S., an 18-year-old girl, was first seen on September 29, 1941, with a complaint of poor vision. She had been under the care of Dr. Raymond Brown of Joliet, Illinois, since infancy, because of bilateral congenital aniridia. About five years ago cataracts began to develop. There was no complaint of pain. Moderate photophobia was present, and she had had some redness of the eyes, with slight discharge, about six weeks previously.

Past history included usual childhood diseases and a severe attack of scarlet fever at the age of six or seven years.

Her father, who also had aniridia, had cataracts removed from both eyes about four years ago, with excellent results. A brother, aged 12 years, also had aniridia and cataracts, but had 50-percent vision.

In the right eye vision was 0.1, corrected to 0.1 with +2.00D. sph.; in the left eye vision was 0.3, corrected to 0.4 with +4.00D. sph.

Examination showed poor convergence, constant horizontal nystagmus, and the right eye was about 10 degrees divergent for near and far. The cornea in each eye was hazy, and mottled with broad macular opacities, most marked in the right eye, which had more dense leukomatous opacities over the vertex, just below, and nasalward. There was vascularization of each cornea, with vessels crossing the limbus into the opacities all around the cornea; there were bilateral dense mottled posterior lenticular opacities. The fundi could not be seen because of the opacities. Both eyes had increased aqueous ray on slitlamp examination.

Serologic and laboratory tests were negative. A histamine test showed markedly diminished gastric acidity.

The patient was advised to use 1-percent atropine and hot compresses, and vitamins and iron in the form of riboflavin, Feosol tablets, and hepicebrin. The anterior-chamber reaction became clear. The left eye became inactive, but activity in the right eye continued. Intravenous injections of rivoflavin, 1 mg. daily, were started on December 8, 1941, and there has been marked diminution of the keratitis. Staining with fluorescein showed only a few punctate dots, and the corneal and conjunctival vascularity has markedly decreased.

Sympathetic ophthalmia

Dr. Edward X. Crowley. In 1916, J. O, a man aged 63 years, sustained an injury to the right eye with a piece of steel. The foreign body was removed immediately, and the eye remained symptomless until two years ago. Vision gradually decreased, the eye became moderately reddened on several occasions, and one week before admission there was marked redness and pain.

When first seen on July 14, 1941, examination revealed an old perforated scleral wound, iridocyclitis, and a complicated cataract. Vision sufficed only to count fingers at one foot. No foreign body was found on X-ray study. Examination of the left eye revealed no abnormalities; vision was 1.0 + 1. Proteolac intramuscular therapy was instituted, with heat and atropine. Under this treatment there was some improvement of the right eye, but the anterior chamber still showed countless cells. On August 25th, slitlamp examination showed nothing abnormal in the left eye.

On September 18th, the patient complained of pain in the left eye. There was minimal circumcorneal injection; no deposits were seen on the cornea, but the anterior chamber showed a slight increase in aqueous ray and 10 to 15 cells per slitlamp beam were seen. There was stromal thickening of the iris and the vessels were engorged. The lens showed pigment deposits and early sclerosis. No improvement was noted in 36 hours under sulfanilamide and atropine therapy, and on September 19th the right eye was enucleated. Sulfapyridine and later neoarsphenamine therapy were instituted postoperatively.

Vision in the left eye, which had been 0.4 + 1 prior to surgery, decreased to 0.2 + 1 on October 15th. Numerous deposits and 20 cells per beam were noted in the anterior chamber. On October 25th a slight papilledema was seen.

On last examination, December 8th, the vision in the left eye was 0.8 − 3, the papilledema was subsiding, the anterior

chamber was much clearer, with only an occasional cell, no aqueous ray was present, and the posterior synechias were breaking down.

Traumatic dislocated lens; Retinal detachment; Hole in macula

Dr. Hal W. Hardin. J. R., a 17-year-old boy, was admitted to the clinic on November 8, 1941, with the history of having suffered a blow to the left eye three years before. The eye was sensitive for a few days and gave no further disturbance until one year ago when the patient noted paroxysms of blurring of vision, which gradually increased in frequency. For six months the blurring has been continuous. The vision was R.E. 2.0 — 2; L.E. 3/200; there was central fixation and light projection in the left eye with the exception of the upper nasal quadrant.

Through a 9-mm. pupil and clear media the disc margins of the left eye appeared indistinct and blurred. The disc had a pinker color than that of the right eye, and the vessels appeared attenuated. A flat retinal detachment was seen superiorly 2 disc diameters above the disc. The retina appeared gray and the vessels on its surface were dark and tortuous. In the macula there was a 0.75 disc-diameter oval hole. The slitlamp showed an increased ray with three to five cells in the anterior chamber. There were no deposits on the cornea. The lens was dislocated nasalward. There was a crescent of dark-brown pigment spots on the peripheral posterior surface. Bjerrum and peripheral fields showed a sector defect below.

Optic neuritis

Dr. J. A. Gans. M. E. S., a white girl, aged 19 years, was in perfect health until November 1, 1941, when swelling and redness of the eyelids of the left eye developed, with blurring of vision and pain. She had been treated with hot compresses, vitamin B, and short-wave diathermy prior to admission to the clinic.

Examination showed no abnormalities of the right eye. There was no light perception in the left eye. The pupil was 1.0 mm. larger than the right, and showed no reaction to light; there was good reaction consensually. The fundus showed intense optic neuritis of 3.5 diopters' elevation. Blood smear showed a relative lymphocytosis with 46-percent polymorphonuclears and 46-percent lymphocytes. Serology and laboratory tests were negative, as were X-ray studies of the chest.

Neurologic consultation disclosed right facial weakness and a few hyperactive reflexes. The tonsils, which were infected, were removed. Further therapy consisted of high-vitamin intake with administration of parenteral thiamin chloride. The possibility of multiple sclerosis has not been ruled out.

Partial external ophthalmoplegia

Dr. B. Milder. A girl, aged 11 years, was admitted to the clinic for surgical repair of a cleft palate. She was referred to the eye department because of deviation of the right eye and drooping of the right upper lid.

The past history gave no relevant findings. The mother said that the right eye had turned out and down since the child had been at least six years old. There was no history of diplopia, or of difficulty with stereopsis. Examination showed a ptosis of the right upper lid. With the left eye fixating in the primary position, the right eye was deviated 50 degrees in the 225-degree meridian (about 40 degrees out, 35 degrees down). The right eye showed limitation of motion upward, down in, and slightly inward. The left eye had normal extraocular movements. The pupils were equal, 3 mm. in size, regular, and round. They reacted normally

to light and accommodation. The range of accommodation was normal, R.E. 11.5 diopters, L.E. 13.5 diopters. The vision was R.E. 0.5 −2, L.E. 1.5 − 4. Atropine refraction showed R.E. +3.00D. sph. ⊂⊃ +1.25D. cyl. ax. 120°, vision 0.5 − 2; L.E. +2.25D. sph., vision 1.2. Peripheral and central fields were normal. All laboratory and serologic studies were negative. X-ray studies of the skull, sinuses, and optic foramina were negative except for the cleft palate. There was no evidence of fusion on the synoptophore. No suppression tendency was noted.

The diagnosis of right partial external ophthalmoplegia was made on the basis of abnormality of the right lateral nucleus of the third nerve, possibly congenital. This opinion was concurrent with that of the neuropediatrics department.

Scientific meeting

Prevention of blindness in Illinois, 1940-1941 (Motion picture)

Audrey Hayden, secretary, Illinois Society for Prevention of Blindness presented this picture.

Diathermy of the ciliary body for glaucoma

Dr. Samuel J. Meyer gave a preliminary report on this subject.

Discussion. Dr. Louis Bothman said that at the University of Chicago Clinic this operation had been performed on the type of eye Dr. Meyer described, blind painful eyes on which other operations, such as iridectomy and sclerotomy, had failed to control the tension. Later an operation was performed on an eye with 20/20 vision, and one with 20/100 vision, with no further loss. While in most instances the tension rose again in a few weeks, the patients were relieved of the unbearable pain. There have been no reports of sympathetic ophthalmia following this operation, and histologic studies on eyes enucleated after cyclodiathermy show no evidence of that pathologic picture.

Dr. G. H. Mundt said that of three patients operated on, two had an excellent result as to tension. Ordinarily, operations can be performed under local anesthesia, but with this type of procedure it is difficult. Although patients are given morphine and nembutal, and fully prepared for surgery, they shrink from the diathermy. He wondered if Dr. Meyer had considered using the thermaphore. This had been recommended and might be of service instead of diathermy puncture.

Robert Von der Heydt.

NEW YORK SOCIETY FOR CLINICAL OPHTHALMOLOGY

December 1, 1941

Dr. James W. Smith, *presiding*

Symposium on pitfalls in ophthalmic practice

Pitfalls in ophthalmic diagnosis

Dr. Sigmund A. Agatston discussed some of the common diagnostic pitfalls encountered during an ocular examination. He pointed out that one of the greatest errors in the practice of ophthalmology is to allow interest in other branches of medicine to wane, and stated that to function properly, the ophthalmologist must ever correlate ocular conditions with systemic disease. Another important source of diagnostic error is incomplete examination.

Discussion. Dr. Mark Schoenberg stressed the importance of plotting visual fields in all doubtful cases. He cited a case of immature cataract, in a myopic patient with poor vision, in whom it was discovered that the visual fields showed

a binasal hemianopia. The patient was referred to a neurologist.

Dr. Schoenberg also suggested rod palpation as a diagnostic aid in early iritis. The procedure consists of gently pressing with a slender rod all around the corneal limbus. Occasionally an area is found which, on slight pressure with the point of the glass rod, is acutely painful. Within a short time the entire pericorneal zone, corresponding to the root of the iris and ciliary region, is tender. As the iritis subsides, the tenderness disappears.

Use of fluorescein with soda bicarbonate by mouth is also valuable in early signs of anterior uveitis. With the aid of a narrow beam of the slitlamp, fluorescein is seen appearing within half an hour in the aqueous in the presence of iritis, but not if the eye is normal.

Slitlamp examination in cases of retinal detachment was also urged. Dr. Schoenberg cited a case in which a diagnosis of intraocular foreign body had been made after slitlamp examination showed a scar in the cornea and a hole in the iris. The patient had previously been operated on for retinal detachment, with a poor result.

Dr. Benjamin Friedman suggested the following reasons for some failures in diagnosis:

1. An attempt on the part of the ophthalmologist to make a diagnosis on the first examination of the patient. This is not expected of the general physician and should not be expected of the eye physician, especially in complicated cases. Young ophthalmologists should be cautioned not to permit themselves to be compromised into making a diagnosis at first sight.

2. Failure to dilate the pupil when one is hurried or because of impatience on the part of the patient.

3. Securing a careful history of the patient sometimes averts diagnostic failures. One word may lead to a diagnosis that is otherwise obscured.

4. Failure to follow a standard routine of examination often leads to neglect of data that might have pointed to a diagnosis.

5. The value of bacteriologic study is well known now, due particularly to the work of Dr. Phillips Thygeson. Sometimes, because of expense or the difficulty of obtaining cultures, it is omitted, and a diagnosis of fungus infection is overlooked.

Pitfalls in cataract surgery

Dr. Louis Lehrfeld contrasted the results of the expert ophthalmic surgeon, who has far fewer complications, with those of the occasional surgeon who might perform a half-dozen operations a year. He stated that inasmuch as most ophthalmologists are not eye surgeons, it behooves those who are trained only in medical ophthalmology to be content in that field and not attempt to perform an occasional operation.

A team of assistants under the direction of a surgeon was recommended. The object of such a team is to prepare the patient for the surgical ordeal and to ascertain whether he is a good risk. The principal member of that team is the first assistant, who is responsible not only for the detailed reports and ocular examination of the patient, but for the preparation of the operating room, most important of which is the inspection of instruments for their sharpness.

Of special importance in avoiding pitfalls is the thoroughness and completeness of the anesthesia of the eyeball. In ophthalmic surgery cocaine has no equal in its effectiveness as a local anesthetic. Novocaine is used for deep anesthesia by retrobulbar injection. It is also used to control the orbicularis. Completeness of

anesthesia avoids such complications as loss of vitreous, prolapse of iris, and expulsive hemorrhage.

Suturing of the corneal section is regarded as one of the most important steps in cataract surgery. Such a suture gives an added margin of safety, permitting the patient to be out of bed the next day. Complications such as backache, abdominal distress, urinary frequency or infrequency, and delirium are thus largely avoided, and the period of convalescence is considerably shortened. Emphasis was placed on the use of sterilized drugs in the eye on completion of the operation.

As a preoperative precaution when dealing with the foreign-language-speaking patient, he is taught in his own language, the day prior to operation, a technique of tapping or signaling on the forehead, chest, over the bridge of the nose and chin so that he will coöperate with the surgeon at the time of operation. These signals are intended to tell the patient when to look up or down and when to open and close the eyes. Many pitfalls of cataract surgery are due to the fact that foreigners are regarded as uncoöperative while in reality they do not understand what is wanted of them.

Discussion. Dr. B. Esterman asked if Dr. Lehrfeld had difficulty with drying of the cornea when cocaine was used as the anesthesia.

Dr. W. Steinbugler asked how the cataract suture was inserted.

Dr. Lehrfeld said he had found no difficulty with cocaine. Drying of the cornea can be avoided by flushing the eye and by closing the eye for a few moments.

The suture is always inserted in the cornea about 1 mm. from the limbus, from the nasal side of the eye, in a single or in multiple bites. The loop should be on the temporal side. Pick up a mass of the conjunctiva and episclera and put the suture under the mass and tie above and nasally so that it looks like a square. When removing it, cut the loop which is on the temporal side. Use cocaine anesthesia for this purpose. Sutures may be removed after one week, but may remain for three or four days more if necessary. If removed too early the wound will reopen. The suture is inserted before the section is made, never after.

Both eyes are always covered immediately after operation, but the eye not operated on is uncovered when the patient is allowed out of bed.

Pitfalls in muscle surgery

Dr. Rudolf Aebli stated that pitfalls in muscle surgery may be due to (a) errors in technique, or (b) errors in diagnosis resulting in operations on improper muscles. Among errors in technique he listed:

1. Improper dissection, cutting of the muscle, stripping of the capsular muscle envelope.

2. Mistakes in placing the sutures in the muscle: In the recession operation sutures must be placed in the tendon 1 mm. from the cut edge; in the resection operation the sutures must be passed through the retained anterior and posterior fascial-muscle envelope so that they will not tear out between the muscle fasciculi.

3. Mistakes in anchoring muscle to sclera, either above or below the midline.

4. A good dry field should be obtained —all clots removed so that no organized blood clots can form under the attached muscle and so create adhesions to the sclera, thus forming an area of traction behind the anchored tendon. This would cause an overcorrection in recession operations and a decided undercorrection in resection or advancement operations.

5. Retraction of caruncle with produc-

tion of "glassy stare," due to disturbance of the caruncular support—caused by the cutting of the trabecula between the undersurface of the caruncle and the anterior fascial covering of the muscle.

6. Insufficient freeing of taut fascial side attachments. Careless closing of conjunctiva with improper apposition of edges frequently results in annoying granulomata.

Errors in diagnosis that produce pitfalls in muscle surgery are frequently seen in (1) cases of hypertropia with exotropia, (2) cases of pseudoptosis with vertical-muscle imbalances, (3) cases of convergence paralysis with marked exotropia, (4) strabismus fixus cases, (5) atypical-retraction syndrome cases especially the bilateral types with slight retraction, and (6) unrecognized myasthenia gravis.

Pitfalls in glaucoma surgery

Dr. Algernon B. Reese stated that a keratome incision should be placed in the most peripheral portion of the angle. Most keratome incisions, as seen in microscopic sections, are too centrally placed. There is a much wider margin of safety in placing the incision more peripherally than is generally believed. One reason for the more central incision is that the limbus in some patients is quite broad, and, unless this is appreciated at the time of operation, a keratome section can be placed actually in the cornea when the operator thinks it is in the sclera. When the incision is too central it is much more difficult to remove the iris at its base. The surest way to secure a basal iridectomy is to tear the iris from its insertion in the ciliary body. Sometimes an acute exacerbation of a chronic glaucoma is mistaken for an acute glaucoma, and an iridectomy is performed.

The commonest cause of a poor trephining operation is a dull trephine. With a dull instrument the tendency is that Descemet's membrane is pushed ahead of the trephine because it is much denser than the corneal stroma. In such an instance Descemet's membrane may block the trephine opening and prevent the prolapse of the iris and also prevent proper filtration. Also with a dull instrument the tendency is not to go cleanly through the limbus, thus allowing the aqueous to leak out gradually, with a loss of the anterior chamber and no prolapse of the iris. When the limbus is broad, a shelving is required. A proper shelving or splitting of the cornea is necessary in some instances to get beyond the peripheral synechias and often to get beyond the ciliary processes, so they will not prolapse into the trephine opening. If broad peripheral synechias are present, the trephine may enter directly into the posterior chamber.

In most instances of cyclodialysis operation, the anterior ciliary artery is injured by the spatula as it passes between the sclera and the ciliary body. Thus hemorrhage appears in the anterior chamber. If the operation is performed on an aphakic eye, as is quite frequently the case, the hemorrhage may enter the vitreous and seriously impair the vision following the operation. When the spatula is inserted between the sclera and ciliary body through the scleral spur into the anterior chamber, it may detach Descemet's membrane if the point is applied too snugly against the posterior surface of the cornea. If an anterior marginal ring, or Schwalbe's ring, is present, then such an occurrence is more probable.

If the sphincter muscle is not cut in an iris-inclusion operation, the tendency is that the pupillary border of the iris retracts into the anterior chamber. Such an occurrence knuckles the iris into the wound and obstructs filtration.

Discussion. Dr. M. Schoenberg said

that one of the greatest difficulties to be dealt with is the handling of cases in which synechias are in the angle of the anterior chamber. In such an event, the advantages of cyclodialysis ought to be emphasized. One can notice that the depth of the anterior chamber is greater postoperatively. Cyclodialysis is the least traumatizing of all operations and can be used as a starting point. Later, some other operation can be performed, such as trephining, iridencleisis, and so forth, if necessary.

The participation of the anterior ciliary arteries in regulating the intraocular pressure is not generally realized. These arteries usually run in the thickness of the sclera and cannot be cauterized easily, unless the superimposed scleral tissue is first incised and dissected; even then cauterization will not prevent hemorrhage into the anterior chamber. Perhaps hemorrhage could be prevented by performing the cyclodialysis away from the area where the ciliaries enter the uvea.

Another aid to getting into the anterior chamber properly is to do so by means of transillumination at the limbus, which shows up the perilimbal space as a circle of light outside the margin of the cornea. This can then be marked off with gentian violet or silver nitrate.

Dr. F. Theodore asked what should be done when it is assumed that Descemet's membrane has been left after the trephine plug is removed.

Dr. Reese replied that the trephine opening should be enlarged on each side with scissors.

Dr. Schoenberg asked whether cauterization of the anterior ciliary arteries really prevented hemorrhage in the anterior chamber.

Dr. Reese replied that he was not sure that the cauterization of these vessels did obviate or decrease the hemorrhage, as he had not practiced this procedure long enough to evaluate it. He stated that hemorrhage in the anterior chamber at the time of a cyclodialysis operation was not particularly important, except possibly in aphakic eyes, when it could enter the vitreous and cause a reduction in vision. He thought, as Dr. Schoenberg did, that perhaps hemorrhage could be averted more satisfactorily by trying to place a cyclodialysis operation at a site where no anterior ciliary vessels existed. He did not believe that freeing the peripheral synechias at the time of a cyclodialysis operation led to a resumption of aqueous drainage through the trabecula where synechias had previously existed.

Sidney A. Fox,
Secretary.

NEW YORK SOCIETY FOR CLINICAL OPHTHALMOLOGY

January 5, 1942

Dr. James W. Smith, *presiding*

Special staining methods as applied to ocular tissue

Dr. Ignatius Sommer presented this subject during the instructional hour.

A case of adamantinoma involving the orbit

Dr. Charles Littivin presented the case of a white man, aged 60 years, who had an adamantinoma of the left maxilla and orbit which developed three months after the extraction of some teeth. Following surgical removal and electrocoagulation of the mass there was recurrence in six months. Subsequent irradiation had been unavailing and there was now involvement of the conjunctiva and lids, although vision was still unimpaired. Adamantinoma is an epithelial tumor arising from the odontogenic apparatus or from cells with a potentiality for

forming tissues of the enamel organ. It is usually unicentric, nonfunctional, intermittent in growth, anatomically benign, and clinically persistent. It is most commonly found in the mandible or maxilla but occasionally has been discovered in the hypophysis and rarely in the tibia.

Use of gold sodium thiosulphate in a case of exudative retinitis

Dr. S. A. Fox read a paper on this subject which has been published in this Journal (August, 1942).

Discussion. Dr. I. Givner asked what the explanation was for the plastic exudates described in this case. Vitreous hemorrhage can easily be explained by the obstruction to the retinal venous system due to seepage into the sheaths surrounding the optic nerve from the subarachnoid hemorrhage, but exudates are more inexplicable.

In regard to gold therapy, it has been reported that one can gauge the amount of gold in the patient's system by deposits in the cornea. The latter are of two types, either in Bowman's membrane in the center of the cornea or peripherally at the level of Descemet's membrane. In numerous arthritic patient's receiving gold he saw no deposits in the cornea. This discrepancy from reported cases may be due to the fact that a different form of gold was used in the two series of cases. Were any deposits noted in this case?

Dr. A. Kornzweig asked how the gold drug worked in these cases.

Dr. S. A. Fox, in closing, stated that the cause of the marked exudative and hemorrhagic phenomena in this case is speculative. One possible explanation is a disordered capillary permeability caused by obstruction to venous outflow as a result of cerebral edema and increased intracranial pressure. This may have resulted in a massive outpouring of exudative and vascular products into the retina with rupture through the limiting membrane into the vitreous.

Although numerous cases of corneal deposit of gold have been reported, none was seen in this case. As for the rationale of the gold action in the body, there is no definite answer as yet. It has been found that compounds in which gold is bound through a sulfhydryl radical are best, and these are now in use. But whether the action is due to stimulation of the reticulo-endothelial system or by direct chemotherapeutic action on the etiologic agent is not definitely known.

Cyclic oculomotor paralysis (Axenfeld)

Dr. Isadore Givner reported the case of a white man, aged 32 years, whose mother first noted drooping of his left upper lid when he was six months of age. This together with an immobility of the eyeball continued until 1929, when, at the age of 20 years, he was operated on unsuccessfully for ptosis. The following year a divergent strabismus of his left eye was corrected. The next year a resection of the levator was performed, but this, too, failed to improve the appearance of the ptosis. Very soon after the last operation the following phenomenon first showed itself. Upon observing the left eye, after one minute a little twitching is seen to arise in the upper lid and gradually become quicker and livelier—ending with a complete opening of the palpebral aperture. At this moment the pupil, which is 8 mm. in diameter, contracts to 3 mm., while the normal pupil of the right eye keeps its usual size unchanged. After 20 seconds the left upper lid falls slowly and at the same time the pupil dilates again. This cycle repeats itself at irregular intervals all day long. It also occurs, but less frequently, during sleep. During the

spastic phase his refraction changes, as was observed with the retinoscope, in that he becomes 2 diopters more myopic —showing the association of the ciliary muscle in this spasm. In addition to his ptosis he has a complete third-nerve paralysis of the muscles of the left eye, very little function in the lateral rectus, and an active superior oblique here. His right eye is normal.

Pupillography, carried out by Dr. Otto Loewenstein, showed that 25 minutes after eserine instillation in the conjunctiva, the pupil of the left eye reacted better to light than before, in both the spastic and paralytic phase. This is interpreted as indicating a diminution of free acetylcholine in the left eye. The cycle phenomenon is concluded to be due to a partial destruction of the third-nerve nucleus and its supranuclear connections to the sympathetic center in the diencephalon, associated with the same factors that normally induce pupillary unrest.

Discussion. Dr. A. Kestenbaum asked how it was possible to distinguish between the contraction of the pupil of the right eye during the cyclic phenomena and a normal consensual light reflex.

Dr. E. Krimsky asked how the pupillary unrest differed from hippus.

Dr. O. Loewenstein said that the changes observed in the right eye during the cyclic phenomenon were not detectable to the naked eye—they were seen only with the magnified pupillogram. Pupillary unrest may take place in only a portion of one pupil—hippus, a rare condition, is bilateral.

Unusual disciform retinal lesion with ectopia maculae

Dr. Benjamin Friedman read a paper on this subject.

Discussion. Dr. A. Epstein asked what the visual acuity was.

Dr. A. Kestenbaum asked about the possibility of a false macula or deficiency of muscles in the sense of cyclophoria.

Dr. J. Smoleroff asked if the scotoma should not have been caeco-central.

Dr. B. Friedman said that the corrected visual acuity of the right eye was 20/400 and the refractive error −3.00D. sphere with a −3.00D. cylinder. There was a similar refractive error in the other eye with a corrected vision of 20/15.

The only muscle defect was a slight exophoria. When the patient fixated with the right eye the eye was turned down and nasalward. When the other eye was covered, no change in the position occurred. The fixation point in the eye is the permanent fixation point. No cyclophoria was grossly evident on inspection or by means of parallel Maddox rods. The identification of the true macula with the fixating spot was determined by Bielschowsky's cross and by entoptic methods.

When looking into a normal eye the examiner can judge the approximate normal position of the optic nerve; in this eye it was apparently in the normal position. He did not think the eye was rotated because of the normal position of the optic nerve. He said that there are six cases of heteropia on record, five of which were studied clinically and the sixth from pathologic sections. In the five cases studied clinically the eyes were in a divergent position when fixating, indicating that the macula was displaced temporally. When looking into the eye, the optic nerve presented itself on direct inspection instead of the normal retina.

The scotoma was exactly like the lesion—large, circular, mostly absolute, with an extension due to the proliferation from the lesion. Since in the fundus picture the lesion was not continuous with the disc, there is no reason to believe that a caeco-central scotoma should have existed.

Regarding the diagnosis of avitaminosis "A." Gross and biomicroscopic examination of the conjunctiva

Dr. Milton L. Berliner presented a paper on this subject which was published in this Journal (March, 1942).

Discussion. Dr. J. M. Lewis was of the opinion that the paper was important and timely in view of the wide publicity given to the study of Dr. Kruse. He felt that Dr. Berliner proved that the conjunctival lesions were not due to vitamin-A deficiency. The chief argument against the contention of Dr. Kruse, that the conjunctival lesions are due to vitamin-A deficiency, are (1) the histopathologic changes are in the subepithelial layer whereas in vitamin-A deficiency the lesion is in the epithelium; (2) the lack of rapidity of response to treatment, whereas in vitamin-A deficiency improvement is noted in a short time following administration of vitamin-A therapy; (3) in cases of vitamin-A deficiency in infants and children, as indicated by poor dark adaptation or low vitamin-A blood level, no changes in the conjunctiva were noted; (4) blood examination in adults having conjunctival lesions, as described by Kruse, revealed normal concentrations of vitamin A.

Halfmoon-shaped corneal pigmentation in pterygium

Dr. Fritz J. Bloch discussed superficial corneal pigmentation in old scars, conical cornea, and senility. He also described a yellowish pigmented line surrounding a pterygium in three cases.

The binocular examination of the young child

Dr. Emanuel Krimsky stated that the central corneal light reflexes were the most single gratifying aid in the objective estimation of both manifest and latent squint. The use of prisms facilitates this test, since the amount of prism required to shift a peripheral corneal reflex to the center of the pupil in a deviated eye represents the amount of deviation present. This prism-reflex test helps to determine objectively the amount of prism convergence and divergence, it enables one to tell at a glance whether objective heterophoria exists as a result of lateral as well as vertical displacement of the light reflex and in paralytic squint. The amount of primary and secondary deviations can be measured at will. The advantages of this test over the Hirschberg and cover tests is that it simplifies the whole procedure by interpreting deviation in relation to central corneal reflexes.

Discussion. Dr. E. Metzger suggested that the failure of the Hirschberg test could be avoided by placing the eye (of the examiner) directly behind the light.

Dr. J. Smoleroff asked what method Dr. Krimsky used to demonstrate the corneal light reflex.

Dr. J. Pascal agreed that it is not easy to see when motion has been really stopped by ordinary cover test. However, he wondered whether the corneal-light-reflex test was not at least as difficult to evaluate. Furthermore it might be less certain because of the varying values of the angle kappa.

Dr. Krimsky stated that it was not easy for the examiner to keep his eye directly behind the light. Moreover, a crude estimate of millimeter-displacement of this reflex had to be translated in terms of arc degrees. With the author's prism-reflex test, a rotary prism was placed before the fixating eye, and by its rotation the center of the pupil of the deviating eye was brought in direct line with the light source, while the eye behind the prism deviated in the direction of its apex. Readings were made directly

in terms of prism-diopters rather than by vague computations.

He stated that the light source should be sufficiently bright to enable one to see the reflex with ease. A dim light such as a candle placed at 20 feet was poor for the study of ocular movements as well as pupillary light reflexes.

Proficiency in the use and interpretation of the cover test required experience and training. The same was true of his prism-reflex test. In order to interpret findings by the corneal-light-reflex test, a bright test light was required, and the reflexes were studied monocularly as well as binocularly.

Sidney A. Fox,
Secretary.

COLLEGE OF PHYSICIANS OF PHILADELPHIA

Section on Ophthalmology

January 15, 1942

Alfred Cowan, M.D., *chairman*

Some clinical aspects of the blood supply of the optic nerve and chiasm

Dr. Derrick Vail stated that since the finer details of the blood supply of the optic nerve and chiasm were not adequately covered in the textbooks of ophthalmology, a review of the literature and the correlating of information from various sources should be of interest to ophthalmologists.

The anatomic variations of that portion of the chiasm and blood vessels that make up the circle of Willis were discussed. The factors of clinical bearing were mentioned. Among these were the effects of pressure from the anomalous position of blood vessels; diseased atherotic vessels; inflammatory fibrous bands compressing the vessels and, secondarily, the optic nerve; and the known effect of tumors of the pituitary region. The central retinal artery itself apparently played a very small role in nourishing the optic nerve.

Anatomic studies showed that just before the central artery pierces the arachnoid sheath of the optic nerve it sends a posterior collateral branch into the interior of the nerve, and it is this vessel that supplies the area of the papillomacular bundle. The periphery of the optic nerve is supplied by finer arterial twigs derived from the ophthalmic artery and its branches in the orbit. The pial network is the vessel-carrying structure in the nerve tissue. The intracanalicular portion is supplied by the ophthalmic artery also, but the pial network is exceedingly poor. The intracranial portion is supplied by branches from the anterior portion of the circle of Willis, which penetrates the intracranial portion of the optic nerve from the outside inwardly.

Evidence was presented to indicate that the papillomacular bundle is particularly vulnerable in the intracranial portion of the nerve, and here may be the first site of lesions due to multiple sclerosis, syphilis, and the inflammatory diseases.

The paper discussed the clinical conditions of subarachnoid hemorrhage, subdural hemorrhage, papilledema, embolism, edema of the septa, arachnoiditis, fractures, meningitis, tabes, aneurysms, sclerosis of the optic-nerve vessels themselves, and multiple sclerosis. The recent work of Walsh and King (Archives of Ophthalmology, January, 1942) emphasized the extreme efficiency of the collateral circulation through the ophthalmic artery. This aspect was discussed.

Warren S. Reese,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY

January 17, 1942

Dr. William H. Crisp, *presiding*

Method of cataract incision

Dr. H. Rommel Hildreth (by invitation) gave a lecture on his method of making a cataract incision and some of his associated procedures.

Malignant melanoma of the choroid

The following report was submitted by the Eye, Ear, Nose, and Throat Clinic of the Fitzsimons General Hospital:

J. A. W., a soldier, aged 24 years, gave a history of having rather poor vision, but that it was correctable with glasses. He had been refracted two months previously with satisfactory results. About one month ago he noticed that the vision in his left eye was blurred. This blur involved mainly the upper half of the field of vision, was persistent, and gradually getting worse. He was again refracted but the vision could not be improved, so he was referred to the Hospital.

Examination revealed a grossly normal-appearing left eye. The pupil was round, reacted normally to light and accommodation, and presented a normal red reflex. The vision was 20/200 and could not be improved with lenses. The upper half of the field of vision revealed a large defect. The media were clear, the vessels normal, and there was no pathologic cupping of the disc. There was a V-shaped detachment of the retina, inferiorly from the disc, forward, and slightly medial. The apex of the V was posterior, and the anterior portion of it was about the width of one sixth of the fundus. This area was dark on transillumination. A diagnosis of subretinal sarcoma was made.

A classical enucleation was performed, and since no evidence of extrascleral extension was found, a glass-ball implant was used. The postoperative course was uneventful. The eye was sent to the Army Medical Museum for examination, and the following report was received: "*Gross.* The firm eye measures 25 by 26 by 24 mm. The cornea is clear, and the pupil dilated. The eye is opened between the horizontal and vertical planes. Beneath the detached retina to one side is an oval-shaped pigmented mass measuring 13 by 10 by 11 mm. The lens is opaque, and the vitreous cloudy. The optic nerve is too short for cross section. The tumor extends from the ora serrata to a point midway between the disc and equator. It appears to have broken through the sclera, forming a flat dark nodule on its outer surface below the equator. *Microscopic.* Arising in the choroid is a rather heavily pigmented tumor which has extended through the sclera posterior to the equator. Invasion of the retina is not seen. The tumor cells are spindle-shaped, with oval, generally nucleolated nuclei. A Wilder reticulum stain shows an argyrophil fiber content of about 50 percent. The iris is edematous. The retina is partially detached, with serous exudate which contains pigment-laden phagocytes and a few red blood cells, beneath it. There is a little granular exudate in the optic cup. The lamina cribrosa does not appear depressed.

"*Diagnoses.* Malignant melanoma, choroid, Callender spindle cell, subtype B, with extension through sclera; partial detachment of the retina."

Harry W. Shankel.
Secretary.

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WAR VISION

Napoleon's adage that an army marches on its stomach produces the mental image of a huge crawling worm. Modern war has amply demonstrated that this worm, which nowadays is more like a humming bird, must have eyes as well as stomach, and eyes that not only must see quickly and clearly by day, but, what is just as important, eyes that must see quickly and clearly by night. Put out the eyes and the worm becomes helpless. Improve the vision of the eyes and the offensive and defensive of the army is correspondingly speeded up. The significance of this fact has been a little slow in evolution but once realized it has stimulated research which has led to tangible results in modern war. The complicated and intricate optical devices such as tank periscopes, range-finders, bomb sights, and so forth, require quick and accurate vision for near and distance—they call for the best possible visual efficiency. This visual efficiency must be maintained under conditions of fatigue, oxygen want, and, in some cases, exhaustion.

In the last war the problem of spectacles and the supply was one with which the rear of the army only was occupied. Due to the enormous size of the modern army it has become necessary to utilize men for front-line activities whose vision is subnormal without glasses. The myopic

tank driver who has lost or broken his glasses is as much a casualty as if he had been severely wounded, and his tank is rendered as helpless as if it had been shattered with gunfire. The hypermetropic soldier in his late thirties finds that under conditions of fatigue he becomes presbyopic and can no longer read, except with difficulty and more slowly, the minute scales of his bomb sights and range finders. Many other specific instances that emphasize the importance of visual efficiency in war could be cited. The point is, however, that supplying and replacing spectacles to the troops takes on a new and vital importance. In the highly mobile war of today the replacement of spectacles calls for fluidity of movement in as simple and efficient a manner as possible. This problem has been fully understood and is being solved.

It is no secret that our British allies have discovered the great value of keen night vision particularly in the R.A.F. pilots and bombardiers. Ingenious and relativley simple tests have been invented to uncover the personnel having the best night vision. From many studies that are being carried out it has been found that night vision is an inherent quality with individual variations. It cannot be improved in a normal person by the ingestion of vitamins no matter how massive the dose, but it can be temporarily decreased by oxygen lack, poor physical condition, exhaustion, and disease. The direct result of these tests evolved in the laboratory have naturally led to the selection of the best personnel for night-fighting work.

There are many other phases dealing with the problem of improvement of visual efficiency that are constantly being studied, and much information, most of it at the moment secret, is being obtained. By the end of the war the practical results obtained from these studies will undoubtedly be utilized for peaceful pursuits.

The surgery of ophthalmic war injuries is the same as that practiced in civilian life. The plastic repair of injury to eyelids has naturally received an impetus, and an improvement in technique as well as new ideas is to be seen on all sides. The low ferrous content of the modern missile presents a difficult ophthalmic problem and requires the use of much stronger magnets than was necessary in the last war. In spite of stronger magnets most of these particles are so feebly magnetic that magnet extrication is an impossibility. On the other hand, since there is so little iron and copper in these foreign bodies, experience has shown that they are exceedingly well tolerated, even when they lie within the eye. Traumatic choroiditis frequently involving the macula is a relatively common condition. Hemorrhages into the vitreous usually become absorbed very slowly, probably due to the previously healthy state and youthfulness of the vitreous. It is too early to say whether contracting bands in the vitreous are a frequent result or not. But the impression one has is that they are relatively rare.

It can readily be appreciated, therefore, by considering even the few matters discussed before, how important vision is to the modern army, and what an important place the ophthalmic medical officer occupies.

Derrick Vail.

THE OPHTHALMOLOGIST AND MEDICAL ORGANIZATIONS

I have been asked recently what the relationship of the ophthalmologist should be to his state and city medical organizations. This is a very timely question. There is very properly a close relationship betwen the ophthalmologist and

the general physician. There is in consequence a close bond in their medical organizations. A bond exists in the cities because of the more intimate contacts of the men practicing in the various branches of medicine. It is quite a different matter in communities where there are no men practicing ophthalmology or otolaryngology or the other specialities.

For the benefit of the rural dweller as well as for the rural practitioner there should be on our state as well as national medical society programs a presentation of matters of mutual interest and concern. The points of contact are numerous. This presupposes the attendance of the specialists at the national, state, county, and city meetings and their participation in the program and in the discussion.

If we expect interest to be shown in our branch of medicine we must show interest in the general practice as well as in the other specialties. No one specialty can exist by itself. This has been brought forcefully to the writer's attention on a recent occasion. A program, a symposium on headaches, was presented by a metropolitan medical society at which the psychologist, the internist, the otolaryngologist, and the allergist were represented. No place was given to the ophthalmologist. Thus the large class of cases of ocular origin was completely ignored. Whether this omission was due to the desire not to prolong the program and the discussion or due to lack of interest on the part of the ophthalmologist is a matter for consideration. It is needless to emphasize here the importance of the consideration of the ocular causes of headaches in any symposium on this subject.

In this day of short cuts in the practice of the healing art it behooves all of us who are striving to benefit humanity and to live up to the high standards held up by our leaders that we work together in all possible ways for the relief of the symptoms presented to us by those seeking relief. Special sections and societies are desirable and necessary, but our responsibility does not end with membership in such organizations. Participation and discussion increase our usefulness and our influence for good in our profession. This means more study and discussion in medical meetings of our individual and collective organizations. By participation we shall give better service and relief and continue to hold and to deserve the respect and the confidence not only of the public but of the state as well.

F. E. Woodruff.

PROGRAM FOR BETTER VISION

Though organized medicine strongly opposes socialized medicine, the tendency of our Government is so largely socialistic that there is liable to be action taken in this direction as soon as the executive slate is cleared of more pressing matters. The question is whether we shall anticipate it and aid in determining the form that it will take, or wait to have some most undesirable type of it forced upon us.

Into that scheme will come care of the people's eyes. It is equally clear that the many groups involved in increasing visual efficiency will not be permitted to retain their complete individuality as now, but will be combined supposedly for the public weal.

The ophthalmologist's part in eye care is medical, surgical, and refractive. He is often only the diagnostician and medical director, consulting with the internist, radiologist, otolaryngologist, and other specialists who may administer the needed medication. He must have a broad understanding of the theory and practice of medicine to serve in this capacity. He must know the far-reaching possible implications of optic atrophy, iritis, amblyopia, and a host of similar lesions. To per-

form intelligent refraction such a background, including the vast fields of neurology, psychology, and psychiatry, is invaluable. Those who do not have this must act less efficiently. But since there are many who need lenses who do not present pathologic changes but only a mechanical problem, there exists a large group of nonmedical refractionists who perform refractions successfully on these persons. There are also those nonmedical refractionists who have learned to recognize common ocular pathology and refer patients with eye lesions to ophthalmologists.

Other elements in better visual efficiency have to do with such matters as illumination. The optimum may be determined by research investigations of ophthalmologists and physicists. But the problem of putting these findings into effect rests with illuminating engineers, electric companies, city and plant managers, school principals, and others.

The influence on the eye of the general healthfulness of the community must also be considered. This brings social service into the picture. Hereditary diseases must be controlled, poor housing and poverty have to be combated. The gospel of eye care must be preached, industrial accidents must be minimized. To handle these things organizations such as the National Society for the Prevention of Blindness are most effective.

The manufacturer of eye glasses, the wholesaler, and the retail dispenser all have important parts in the care of the people's eyes.

Any serious attempt to institute a program for better vision must include all of these elements, and it is time for organized medicine to take the lead in uniting them. How is this to be accomplished? Just talking or writing about it will not suffice. It must be begun by some organization, and what more appropriate one than the A.M.A.? Everyone must realize that the day of isolation is over and that a broad point of view is necessary.

The A.M.A. has just appointed a new committee on vision; a rather large group representing many medical elements. Let this committee immediately initiate plans for the formation of national and state groups interested in the people's sight. There should be a committee in each state made up of representatives from every group concerned in visual welfare. The state committee should meet monthly or at other short regular intervals, and the national organization to which the state groups would send delegates should convene annually. Most of the local problems could be handled by the state committees, and those of national interest could be passed on to the higher authority.

It is not a good time for new organizations, obviously, but if we wait until the war is over, this planning will have already been done for us and more than likely after a pattern that is political rather than effective. Organization of the state groups might include one or more —but not too many—ophthalmologists, optical manufacturers, wholesale and retail opticians, optometrists, lighting engineers, social workers, representatives of the National Society for the Prevention of Blindness, possibly a member from the appropriate committee of the state legislature, a representative of any special organizations interested in the welfare of the blind that may exist in a particular state, as for example in Missouri the State Blind Commission, the St. Louis Society for the Blind, the State Blind School.

Obviously there are a host of details to be worked out in forming such a complex organization. The first step would be for this new committee of the A.M.A. to meet and consider their task from a broad point of view. If such ideas as those expressed in this editorial seem sound, the next step would be to contact

representatives of the groups considered important in the set-up and, if the idea is favorably received, to proceed with organization. The task is tremendous, probably necessitating several fulltime executives, but if we do not act, and act soon, ophthalmologists will be taking orders without having a real voice in directing.

Lawrence T. Post.

DEFINITION OF EMMETROPIA

Whether we think in terms of evolution or of teleology, the adaptation of the human eye to the needs of life is remarkable. The eye has, it is true, numerous optical imperfections, including the aberrations for form and color, and particularly the limitations imposed in later life by presbyopia. But for the purposes of primitive existence there were few eyes whose weakness interfered with a normal human activity.

The demands of modern civilization tell a somewhat different story. The study of books, and the finer mechanical pursuits, make many human beings conscious of certain structural defects in the eye which lead either to incapacity for continued effort or to such discomfort and irritation as to reduce the individual efficiency and usefulness. Gradually increasing knowledge of the optical structure of the eye has been responsible for development—chiefly in the course of the past century—of the art of refraction.

There is still a good deal of argument as to the principles upon which correction of refractive errors should be based. It is not surprising that the refractive concepts and practices of Mackenzie, the distinguished British ophthalmologist of a century ago, differed materially from those laid down later by Donders, who may well be regarded as the greatest pioneer in the clinical measurement of human refraction. But more recently there have existed, and there still continue to exist, different views as to how fully either hyperopia, myopia, or astigmatisms should be corrected.

The emmetropic eye has been generally regarded as one "the principal focus of whose dioptric system is, in rest of accommodation, found in the retina" (Donders); in other words the eye which, without effort, accurately focuses parallel rays of light coming from a far distant point. But there is some confusion as to what we mean by the words "without effort," or "rest of accommodation."

As strictly emmetropic, most authors have been disposed to consider only those eyes which maintain accurate focus of far distant objects in a state of complete cycloplegia. In arriving at practical conclusions as to the prescription of correcting lenses, this conception of emmetropia has been qualified by varying ideas concerning what is called latent, as contrasted with manifest, hyperopia, latent hyperopia being that part of the hyperopia, as found under complete cycloplegia, for which the patient does not readily accept correction in relation to the vision of distant objects.

The history of the treatment of hyperopia is intimately associated with the problem of asthenopia, "the phenomena of which," said Donders in 1864, "proceed from nothing else than fatigue of the muscular system of accommodation."

Several interesting facts stand out in the history of asthenopia and its treatment before the time of Donders. That author stigmatizes as "a melancholy page in the history of operative ophthalmic surgery" the fact that certain practitioners, attributing asthenopia to spasmodic contraction of external eye muscles, "had the courage to cut through these muscles." This practice Donders justifiably characterized as belonging "to the fables of the period of operative mania."

Mackenzie, about 100 years ago, drew

up a long list of causes of asthenopia. His somewhat excusable ignorance of refraction led him to make the following melancholy confession: "In many cases it is our duty to declare the disease incurable. . . . Many a poor man have I told to give up his sedentary trade, and drive a horse and cart; while to those in better circumstances, and not far advanced in life, I have recommended emigration, telling them that though they never could employ their eyes advantageously where much reading or writing was required, they might see sufficiently to follow the pastoral pursuits of an Australian colonist."

Donders, commenting on some further statements by Mackenzie, says: "There is no doubt that Mackenzie gave far too weak glasses." But this had happened before Donders "discovered the cause of asthenopia in the hypermetropic structure of the eye."

In a recent article (Archives of Ophthalmology, 1943, volume 29, page 109) which must be somewhat startling to many American ophthalmologists, Munson now proposes the following definition of emmetropia; "Emmetropia is the refractive state of the eye when rays of light parallel to the principal axis of the dioptric system are focused on the retina when acted on only by the normal tonus of the ciliary muscle." In support of this definition Munson argues for an analogy between tonus of the ciliary body and tonus of other muscles throughout the body. "Physiologists teach," he says, "that there is a sustained state of partial contraction of all the muscles of the body, known as tonus, or postural contraction."

To this attempted analogy, however, it may be objected that postural tonus does not involve all the muscles of the body, and does not involve any of them constantly.

According to one of the most complete modern works on physiology (Best and Taylor, 2d edition, page 1333), "Muscle tone is the steady reflex contraction which resides in the muscle concerned in maintaining the posture characteristic of a given animal species." Its seat is "mainly in the antigravity muscles."

The tonus of the antigravity muscles is certainly not maintained when the individual lies prostrate in a condition of general relaxation, and the analogy between the action of these muscles in maintaining erect posture, on the one hand, and the behavior of the ciliary muscle, on the other hand, appears to be far-fetched. The postural muscles of the body are voluntary, striated muscles, whereas the ciliary muscle is involuntary, unstriated muscle.

Munson appears to assume a normal ciliary tonus of one diopter. Those cases in which the refractive findings do not conform to this assumption of a normal one-diopter tonus he explains on the basis of "an overactive state of ciliary muscle or spasticity," or "the weakening of the muscle, or atonicity." "Careful observation," he says "may show that in atonicity the cycloplegic tests may indicate less than a normal tonus."

We are advised that "if during cycloplegia only a plus 1.00-D. sphere is accepted and afterward nothing is required, the eye is emmetropic and tonus is normal." It is further suggested that, "if no lens is accepted during cycloplegia but a minus 1.00-D. sphere is accepted afterward, the refractive state is recognized as myopia."

In Donders's chapter on asthenopia, several passages make it clear that some ophthalmologists of the middle of the last century had been in the habit of correcting the manifest hyperopia and then gradually reducing the hyperopic correction in the hope of obtaining a radical

cure of the asthenopia. But a knowledge of the cause of asthenopia led to a reversal of this attitude.

Donders studied such cases patiently and progressively, and found in many cases that the strength of the correction could be advantageously increased step by step, beyond the amount of the "manifest" hyperopia. In patients at the age of thirty years he found that glasses which corrected only the manifest hyperopia were scarcely ever sufficient. Sometimes, after using a cycloplegic, and thus being able to record the respective amounts of manifest and latent hyperopia, he ordered a full correction of the former plus one fourth of the latter.

Few of us today would be prepared to act on Munson's recent suggestion that certain patients who appear to accept no correction under cycloplegia may properly be given a minus 1.00 sphere upon the basis of a postcycloplegic test. Such a patient would be almost certain to complain, before long, of an important amount of eyestrain.

The very existence, in any great number of patients, of a condition which may truly be called latent hyperopia is in doubt. Many patients, long before the presbyopic age, will rapidly relax to complete acceptance of the full correction as found under cycloplegia. Other patients at first experience difficulty but (sometimes after a few days, sometimes after several weeks) are ultimately able to see clearly at a distance through the correction found under cycloplegia, and are at the same time relieved of important symptoms of eyestrain.

Some patients will not make the attempt long enough to insure a maximum result. But there are only a few hyperopic patients who, after a sufficiently long trial with persistent wearing of the glasses, cannot achieve complete relaxation of the ciliary muscle.

Such successes require conviction on the part of the physician and perseverance on the part of both physician and patient. It is also necessary for the physician to be aware that the hyperopic correction found at four to six meters is not the correction for infinity but must be reduced by one fourth of a diopter. He must further bear in mind the fact that the prescription he orders may be modified by careless placing of the spectacle lenses.

A large proportion of hyperopic patients will accept as full a correction before as under cycloplegia, if adequate use is made of the fogging method. The examiner must know not only how to fog the single eye, from above downward, but also how to take advantage of bilateral fogging, before or after the tests for astigmatism have been made. He must also be willing to spend on the examination sufficient time to afford adequate opportunity for ciliary relaxation, as well as to arrive at precision in other details.

It is, as Donders found, sometimes possible, and it is perhaps sometimes advantageous, to begin with an incomplete correction and then gradually increase the amount of plus sphere prescribed as the patient learns to relax. But this method will have no more, and probably fewer symptomatic successes than the initial prescription of an accurately full correction.

Let us repeat that it is always reprehensible to prescribe minus spheres for a patient who is emmetropic according to the generally accepted definition of the word. The question whether to prescribe a full correction for the hyperope is one for the individual ophthalmologist in dealing with the individual case. But it is well to realize that there is little foundation for the idea that so-called latent hyperopia presents an important problem in the majority of patients.

W. H. Crisp.

BOOK NOTICES

THE OPHTHALMIC PRESCRIBER'S CODEX. By Francis E. Preston, D.O.M.S. Pages VI and 176, Crown 8 vo. Published by H. K. Lewis & Co., Ltd., London, 1943. Price 10s. 6d. net.

No matter how well equipped the ophthalmologist may think he is, respecting the knowledge and use of drugs, there are many occasions in his daily life when he feels the need of prescribing something different or new, at least to him. Or the accustomed prescriptions may not work so well as they should in a given case. Or he may struggle against the daily current that is pushing him into a rut. This little handbook offers him relief.

It is divided into three parts—Formulas, Abridged treatment, and Miscellaneous. The first gives formulas for creams, caustics, capsules, discs, drops, ointments, and so forth, under separate headings, each of which is preceded by a brief definition and description of its manufacture. The second section, devoted to abridged treatment, gives many useful hints that will often be welcome. There is little here with which to disagree, and there is much that is common sense and valuable. The third section covers various drug acts, weights and measures, isotonic and buffered eye solutions, vitamins, appropriate doses, incompatibilities, local anesthetics, normal values for cerebrospinal fluid and blood, and so forth, sulfonamide therapy, electro-therapeutic adjuvants, and even directions for the application of leeches. This last, apparently is about the only old-fashioned thing in the book, unless it be the sonorous and beautiful Latin names like capsulae, cremores aquosae ophthalmicae, guttae ophthalmicae, fomenta, and misturae. These words recall the glorious beginnings of materia medica and are a part of our birthright. They are an attractive feature of the book. Derrick T. Vail.

VERTEBRATE PHOTORECEPTORS. By Samuel R. Detwiler. One of a series of Experimental Biology Monographs. Clothbound, 184 pages, index, and 110 figures. New York, The Macmillan Co., 1943. Price: $4.00.

At regular intervals there appear, in ophthalmologic literature, volumes of general and practical interest to the clinician. These textbooks, as they are termed, set forth teachings and principles in general use—accepted by the profession through time and experience. At similar regular intervals there appear large, weighty, comprehensive treatises on various phases of ophthalmology and related fundamental subjects—recording in great detail current studies together with complete development of the subject and with postulates based on the work. Much more rarely, a volume is presented which bridges the gap, and brings up to date the developments, both clinical and experimental, in some phase of ophthalmology in a manner interesting and pleasing to all members of the ophthalmologic fraternity. Such a book is "Vertebrate photoreceptors," by Samuel Detwiler. This monograph is pithy, concise—yet broad in scope. Each section is treated compactly, but not sketchily.

The early chapters are devoted to descriptive discussion of the form and development of the vertebrate eye, the retina, and particularly the visual cells. Functional anatomy of the retina in terms of Polyak's researches—especially as regards the intraretinal association pathways—is treated in a concise and faithful manner that is characteristic of the entire monograph.

There is an interesting chapter on the relationship between retinal structure and animal habits, which is further elaborated in a later chapter on the relation of the retinal structure to visual acuity. The excellent material of these chapters emphasizes the greater dependence of retinal

structure on the habits of the species than on its phylogenetic status, *per se*. Again, in the same vein, there is a chapter on the "Supposed evolutionary relationships and functional significance of the fovea," in which Detwiler subjects to critical analysis such "supposed" relationships, and places the variations in foveal development on a basis of adaptation to the habits of the species. In this chapter, Walls's theory of the functional significance of the fovea is reviewed in some detail.

The most fascinating portions of the book are those sections in which are reviewed the photomechanical responses of the retina, and the theories of the functional significance of these responses. The author introduces this latter discussion with Arey's quip that "many such explanations reveal the resourcefulness of the human mind rather than the ingenuity of nature," and it is precisely this note of interesting speculation that renders this chapter highly stimulating.

The last portions of the book undertake to review the photopigments of the retina, their relation to vitamin A, and the retinal changes produced by vitamin-A deficiency. It would seem that the photosensitive pigments—rhodopsin and porphyropsin of the rods, and iodopsin of the cones—receive somewhat abbreviated consideration as compared with the discussion of the composition and significance of the lipoid granules found in the region of the outer limbs of the rods in dark-adapted eyes. Here again, the author approaches the borderline between investigative results and speculation in a very absorbing manner.

The monograph is well illustrated with more than 100 figures, the great majority of which are excellent black-and-white photomicrographs. One has the feeling that he has been introduced pleasantly to the inner sanctum of retinal research, without the attendant indigestible masses of research data and technique. The book will delight not only the young ophthalmologist whose knowledge of the retina has been confined to the didactic vein of the textbook, but also the older members of the profession, as a means of placing their knowledge on a current plane.

Benjamin Milder.

CORRESPONDENCE

Reprints for the Editor on active duty

Editor,
American Journal of Ophthalmology:

Word has just been received from Lt. Col. Derrick Vail, who is the ophthalmic consultant to our forces in England, that he would like to receive reprints of articles written by his colleagues in this country.

So, send reprints of your articles as they appear to

Lt. Col. Derrick T. Vail
Office of the Chief Surgeon
A.P.O. 871
New York, N.Y.

These are not only for his benefit, but for the British ophthalmologists with whom he is in close contact.

(Signed) Harry S. Gradle.

Indiana Conference on Industrial Health

Editor,
American Journal of Ophthalmology:

In the last issue of the Journal (April, p. 442) Dr. Alvis in Indianapolis was reported as giving the lecture on "Eye injuries and first aid treatment" at the Indiana Conference on Industrial Health. Dr. Alvis did not give this lecture; it was my privilege to contribute this part of the program myself.

(Signed) Hedwig Kuhn.

On Aldous Huxley's "The art of seeing"

Editor,
American Journal of Ophthalmology:

It seems to me that for the sake of the public and the profession Mr. Huxley's book on the "Art of seeing," reviewed in the April issue of the American Journal of Ophthalmology, should be taken more seriously by ophthalmologists than it apparently is. Mr. Huxley makes two very definite and very strong claims: (1) that visual education (exercises) have given him and others whom he has met in person far better and more comfortable vision than the best prescribed lenses ever have, and (2) that the wearing of lenses to improve defective vision is basically wrong. The reviewer is convinced of Mr. Huxley's sincerity, and most everybody will concede that Mr. Huxley is no fool to be easily duped. What then is the answer to Mr. Huxley's dissertation?

It is true that a great deal of the "science" in Mr. Huxley's book is pseudo-science; that is, something which appears true on the surface, but which can be shown to be really erroneous. But this does not alter the basic facts claimed; namely, that visual improvement through training is far superior to such improvement by glasses and that the latter are generally unnecessary. The proof of the pudding is in the eating, and if the system used by the Bates followers gives good results then so much the worse for the science which claims that it can not.

Mr. Huxley very naturally brings in as an analogy the case of the Kenny treatment for infantile paralysis. Her system of treatment was radically different from the established system used by orthodox medicine. Her work was not only unrecognized, it was ridiculed as being against all established "scientific" principles. But she persisted, and here is the crucial point, she got such excellent results that finally an American university consented to try her method. It was tried and found superior to the older methods in a great many cases. Why cannot some such procedure be tried with the "Bates" method?

Medicine and ophthalmology have lots to live down. We need not go back to the time when the wearing of convex lenses to aid the vision of the old was prohibited by doctors. It is not so long ago that doctors would not let children wear convex lenses, even though when empirically tried they improved vision and made seeing more comfortable. Before Donders clearly differentiated between hyperopia and presbyopia doctors thought it unnatural and very injurious to a child's eyes to have him use the same lenses that were good for his grandfather. Some of this confusion of thought persists to this very day. Empiricism has always played a very important role in medicine. The most revolutionary drugs recently introduced, the sulfonamide group, are used empirically. We do not know just how they act in bacterial infections, but we know that they work and they are therefore used.

The Bates system, as Mr. Huxley himself admits, has been taken up by a lot of quacks who know little of the system but see in it a way of fleecing the public. This abuse is apt to increase as more and more people become aware of the Bates teaching through Huxley's and other books. There is no doubt that a great deal of the Bates system has been overplayed. It certainly is not the cure-all for eye troubles, refractive and other, as seen by an over-enthusiastic lay person be he ever so intelligent. It is safe to say that most refractive errors will need lens correction as against, or possibly with, visual education. But it is also very likely that there are some points in the Bates system which are sound and which can be used with advantage.

Some 20 odd years ago I invited Dr. Bates to expound his theories to a class in visual optics which I was teaching at the time. He delivered an interesting though not too convincing talk on his pet subject. From a private chat after the lecture I gathered that he was sincere in his convictions though some who have known him better told me that he was not. Be that as it may, the thought which was in my mind then, and which is even more appropriate now, is that some university eye clinic ought to take up the system for investigation and trial. Let them make a sympathetic and unbiased research to determine the possibilities and limitations of the method. The good that is in it can then be incorporated into one's general eye practice and the spread of charlatanism at least partially checked.

A final word. At odd times I was induced by force of necessity to try some of Dr. Bates's work, and I must say that though the instances tried were few and the treatment short and casual, I was impressed with the potentialities of the method, not as a cure-all, but as an adjuvant to the correction of visual errors. The establishment of a research center on this work at some university eye clinic, similar to the one established for the Kenny treatment, is, I believe, the only way to meet Mr. Huxley's dissertation.

(Signed) Joseph I. Pascal.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is mentioned only in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy, embryology, and comparative ophthalmology

7
UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Lowenstein, O., and Friedman, E. D. **Adie's syndrome (pupillotonic pseudotabes).** Arch. of Ophth., 1942, v. 28, Dec., pp. 1042-1068.

Adie's syndrome consisting of tonicity of the pupils and absence of tendon reflexes is due to a heredodegenerative disease localized in the great autonomic centers of the diencephalon and their connections with the mesencephalon. It is generally not the result of syphilis but as a syndrome may be produced by asymptomatic nerve syphilis. Possibly some cases of Adie's syndrome are due to congenital syphilis. Physostigmine produces contraction of the Adie pupil as it does of the normal pupil. The drug restores the ability of the pupil to contract to light and to dilate to distant vision. This test with physostigmine is of value in questionable cases, to differentiate between Adie's pupil and similar syndromes due to acquired syphilis. Neurotonia characterized by a prompt contraction to light with sluggish dilatation appears to be an inversion of Adie's syndrome. Hereditary interrelationships indicate that the basic processes for the two conditions are identical. Many minor and abortive forms of neurotonia and pupillotonic pseudotabes can be detected by pupillography. (12 charts, references.)

John C. Long.

Thornhill, P. S., and Thornhill, E. H. **Boeck's sarcoid with nodular iritis.** Amer. Jour. Dis. of Children, 1942, v. 64, Aug., pp. 262-273.

A nine-year-old negro girl who had been affected by recurrent inflammatory symptoms in the left eye showed at examination a cornea hazy in its lower half from the presence of grayish-white superficial amorphous deposits and large "mutton-fat" precipitates on the posterior surface. The pupil, irregular in shape from posterior synechias, showed numerous nodules 1 to 3 mm. in diameter, located both at the pupillary and ciliary margin and protruding into the anterior chamber. Some of the nodules were filled with clear fluid. The lower angle of the anterior chamber was obliterated by an amorphous deposit resembling iris pigment, which had become vascularized

and organized. Scattered deposits of pigment were visible on the lens capsule. All laboratory examinations for tuberculosis proved negative. Microscopic examination of an axillary lymph node showed giant cells but no caseation or tubercle bacilli. The differential diagnosis of tuberculous and syphilitic iritis as against sarcoid of the iris is discussed. The diagnosis of Boeck's sarcoid was established by means of physical examination, X rays of the chest, intradermal tuberculin test, Wassermann test, repeated examinations of sputum, inoculation of specimens in guinea pigs, and histologic studies of lymph nodes. (Bibliography; 6 figures, one in color.)

Melchiore Lombardo.

Turner, F. W., and Krause, A. C. **The role of iron, copper, zinc, and manganese in the metabolism of the ocular tissues, with special reference to the lens.** Amer. Jour. Ophth., 1943, v. 26, March, pp. 260-266. (4 tables, references.)

8

GLAUCOMA AND OCULAR TENSION

Hilgartner, H. L., and Pfitsch, A. **Hemorrhages into the anterior chamber.** Texas State Jour. Med., 1942, v. 37, Feb., p. 681. (See Section 9, crystalline lens.)

Icaza y Dublan, M. J. **A useful palliative in acute glaucoma.** Bol. del Hosp. Oft. de Ntra. Sra. de la Luz., 1941, v. 1, pp. 258-260.

In several cases of acutely high tension, the author has found great advantage in the retrobulbar injection of novocaine with adrenalin (in the amounts ordinarily used for anesthetic purposes), preceded and followed by several instillations of eserine solution.

W. H. Crisp.

Kronfeld, P. C., McGarry, H. I., and Smith, H. E. **The effect of mydriatics upon the intraocular pressure in so-called primary wide-angle glaucoma.** Amer. Jour. Ophth., 1943, v. 26, March, pp. 245-252; also Trans. Amer. Ophth. Soc., 1942, v. 40. (7 tables, references.)

Weinstein, Paul. **Production of aqueous humor and development of glaucoma.** Ophthalmologica, 1942, v. 104, Sept., pp. 166-171.

On the basis of studies, not described in detail, of intraocular tension in rabbits, the author concludes that the aqueous humor arises by secretion as well as by filtration. For this reason he believes that 0.5-percent-pilocarpine solution and 1-percent-epinephrine solution, which decrease the secretion of aqueous, may reduce the intraocular tension in patients with glaucoma. He cites 13 cases in which a weak solution of pilocarpine with epinephrine caused a reduction of tension after 2-percent-pilocarpine solution was no longer effective.

F. Herbert Haessler.

9

CRYSTALLINE LENS

De Voe, Gerard. **Hemorrhage after cataract extraction.** Arch. of Ophth., 1942, v. 28, Dec., pp. 1069-1096.

An intensive study of 453 consecutive cataract operations was made to determine the incidence and causation of postoperative hemorrhage. Of this series hemorrhage occurred after 95 operations, an incidence of about 20 percent. Age, season, blood pressure, or the presence of diabetes, syphilis, or glaucoma, did not seem to be related to the occurrence of postoperative hemorrhage. The type of operation, the use of retrobulbar injection, the type of suture, and the skill of the individual

surgeon had little influence on this problem. An iridectomy done at the time of the extraction increased the chance of hemorrhage by 20 percent. Tests for capillary fragility and determination of the ascorbic acid in the plasma were not reliable in determining the tendency to bleed. Deficiency in vitamin C is not a common cause for postoperative hemorrhage. Deficiency in plasma prothrombin associated with lack of vitamin K is not important. Trauma was the apparent cause of the bleeding in a few of the cases. The systemic administration of snake venom, calcium, and thromboplastic substances, with protein diet, did not appear to be of value in preventing hemorrhage. The physiology of capillary bleeding and of blood clotting is discussed. (Extensive bibliography.)

John C. Long.

Falls, H. F. **Developmental cataracts.** Arch. of Ophth., 1943, v. 29, Feb., pp. 210-223.

This is a review of the results of surgical treatment of 131 cases of developmental cataracts at the University of Michigan. Persons with developmental cataracts are extremely likely to have other serious ocular or general congenital defects. Mental deficiency is a commonly associated condition. These persons have poor protoplasm. Early operation is hazardous, as is shown by the fact that a high percentage of complications and 33 percent of the total failures occurred in patients operated upon before the age of two years. In cases of complete bilateral cataract, the author suggests that one eye be operated upon after the patient reaches the age of six months and that treatment of the other eye be postponed until after the age of two years. In cases of incomplete cataract with sufficient vision to enable the child to get around, surgery should be postponed until the third or fourth year. In the series observed, discission was found to be the safest for very young children. The best vision was obtained when the combined technique of discission and linear extraction was employed. Of 233 eyes, 83 obtained final visual acuity of 6/12 or better. Proved inheritance or a familial tendency was present in 16 percent but a continuing investigation into the genealogic trees in many cases of the series indicates that a far greater percentage is to be expected. Contraception or sterilization is recommended when hereditary cataract is present.

John C. Long.

Goldsmith, J. **Dynamics of intracapsular cataract extraction—experimental studies with reference to the suspensory ligament, Hannover's canal and Petit's space.** Arch. of Ophth., 1943, v. 29, March, pp. 380-434; also Trans. Sec. on Ophth., Amer. Med. Assoc., 1942, 93rd mtg.

Those who argue against the intracapsular operation have claimed that a relatively large amount of trauma is inflicted on the eye during the delivery of the lens and that the eye undergoes deleterious changes later. The author conceived the idea of analyzing the internal and external dynamic factors of intracapsular cataract extraction by direct observation through the corneal microscope, and of presenting a method whereby one could study the effects of this procedure on the anatomic structures in the anterior segment of the eye. The experiments here reported are an elaboration of a previous article (see Amer. Jour. Ophth., 1940, v. 23, p. 590). The aspiration method being employed, 59 intracapsular cataract extractions were performed on eyes enucleated from cadavers four to six hours after death. The present long ar-

ticle comprises a series of related papers, the titles of which are: (1) Macroscopic study of the suspensory ligament; (2) Studies during experimental intracapsular cataract extractions; (3) Application of external force during intracapsular cataract extraction; (4) Hannover's canal. Macroscopic study of the suspensory ligament suggested the complete independence of the vitreous from the lens and posterior zonular membrane. The author claims that in both the anterior and the posterior zonular bundles there is a unifying semisolid cement substance enmeshing the small zonular cords and transforming them into a continuous membrane. The vitreous is fixed most firmly to the ciliary epithelium in a zone some 1.5 mm. broad immediately adjacent to the ora serrata. In the study of the application of external force during intracapsular cataract extraction, a hook was applied at three sites: (1) the limbus, (2) 2 mm. from the limbus on the scleral side, and (3) 1 mm. from the limbus on the corneal surface. When the hook was placed on the limbus or on the corneal surface the force was transmitted chiefly to the anterior zonular membrane and slightly to the posterior zonular membrane in the circumlental space between the ciliary ridges and the equator of the lens. With the application of single-point pressure on the scleral surface, the free extremities of the ciliary ridges were pressed against the equator of the lens. The anterior and posterior zonular membranes and bundles were displaced obliquely as much as 80 degrees. Hence there was a greater tendency for the zonular bundles to rupture in this type of hook application. Horizontal curvilinear pressure concentric with the limbal curve created a peristaltic wave, which was formed by the ciliary ridges moving against the lens equator from the constant shifting of pressure. If the direction of the sustained pressure next employed was posterior and upward, a tearing of the posterior zonular membrane followed, and immediately produced an upward subluxation of the lens. In the discussion of Hannover's canal, the author concludes that there is an organic, agglutinating, interfibrillar cement substance in the zonular bundles, producing a true canal. He argues that Hannover's canal is of special interest (1) because changes in the colloidal chemistry of the contents of the canal may play an important role in the formation of cataract, (2) because the canal plays a part in intracapsular cataract extraction, and (3) because the canal probably shares in other pathologic changes.

The article ends by giving 14 anatomic conceptions of this region which should be borne in mind by surgeons performing intracapsular extraction. The author believes that retinal detachment and choroidal detachment are no more frequent after the intracapsular than after the extracapsular operation. Tumbling combined with scleral pressure seems to be the safest procedure. Goldsmith concludes from his experiments that intracapsular cataract extraction can be undertaken in a majority of cases with a minimal amount of trauma. The discussion by Troncoso, Verhoeff and Minsky is in considerable detail, the latter not agreeing with all of Goldsmith's conclusions. (Bibliography, 38 illustrations.)

Ralph W. Danielson.

Hilgartner, H. L., and Pfitsch, A. **Hemorrhages into the anterior chamber.** Texas State Jour. Med., 1942, v. 37, Feb., p. 681.

After preliminary comments, the authors record six cases. The first patient, a woman aged 47 years, had an ante-

rior-chamber hemorrhage the third night after a preliminary iridectomy for cataract; and a year later the same complication followed a similar preliminary operation. The second patient, a woman aged 48 years, had, after preliminary iridectomy, several anterior-chamber hemorrhages on successive days. The third patient, a woman of 65 years, had repeated anterior-chamber hemorrhages after iridectomy with iris inclusion for glaucoma. The tension remained within normal limits, and useful vision was recovered in spite of the fact that the blood clot had become organized. The fourth case, in a woman of 79 years, was one of repeated hemorrhage in the hemorrhagic type of glaucoma. In two further cases, evacuation of the anterior chamber was rendered necessary by severe hemorrhage following injury. The authors regard preliminary iridectomy as a wise prophylactic measure in regard to the danger of hemorrhage following cataract extraction. (References.) W. H. Crisp.

Malbrán, Jorge. **Barraquer cataract operation (phacoërisis) with corneal suture.** Arch. de Oft. de Buenos Aires, 1941, v. 16, Oct., p. 572.

The author reports his experience in the extraction of cataract by means of phacoërisis according to Barraquer's technique. The different types of corneal suture are described in detail and the author expresses his preference for Stallard's suture as the most effective for preventing postoperative complications. In a series of fifty cases in which intracapsular extraction was done by phacoërisis and the Stallard suture was used, there was loss of vitreous in 6 percent, postoperative iris prolapse in 6 percent, postoperative hyphema in 6 percent, iritis in 2 percent, and corneal opacity in 2 percent. This series included unselected cases, many of them with hypertension, capsular glaucoma, or other complication. (Photographs, bibliography.) Plinio Montalván.

Patch, E. M. **Relation of diet to lenticular changes in larvae of amblystoma tigrinum.** Arch. of Ophth., 1943, v. 29, Jan., pp. 69-84.

Cataracts in the tiger salamander were first observed by the author in a study of the nutritional needs of this rapidly growing larval form for the formation of bone and blood. Cortical opacities with a thin subcapsular space developed in larvae fed for a month or more on a semisynthetic ration containing a high level of purified casein and a smaller amount of powdered milk. The disease did not appear in animals of the same lot fed pulverized beef muscle as a source of protein in a semisynthetic diet, with different combinations of the calcifying vitamin and minerals.

Two types of cortical cataract have been produced, with a definite and constant relation to the source of dietary protein, the chief food requirement of the carnivorous urodeles. The gross and histologic differences between the two types are described and also the apparent gross similarities to human cataract. The nature of the amphibian lens is outlined and reasons are given for its high susceptibility to dietary irregularities. (8 figures, bibliography.) Ralph W. Danielson.

Peter, L. C. **Recent advances in cataract surgery.** Pennsylvania Med. Jour., 1942, v. 45, Sept., pp. 1288-1291.

Among the author's recommendations are avertin anesthesia for the more apprehensive type of patient, intermarginal lid sutures, bridle suture, the use of a Ziegler knife needle for peripheral iridotomy, and a corneoscleral suture. W. H. Crisp.

Rezende, C., and Moura Campos, F. A. de. **Cataract in rats fed a low protein diet.** Arch. of Ophth., 1942, v. 28, Dec., pp. 1038-1041.

Several young rats were fed on a diet consisting of casein, starch, butter, yeast, salt mixture, and cod-liver oil. No galactose was added to the diet. The rats did not show any particular change. Four rats born from the mating of these two rats were kept on the same diet. Each of these four rats developed bilateral cataract. Their growth curve was poor. The low protein content of the diet must be considered in order to explain the appearance of the lens opacities. (5 illustrations, 9 references.)

John C. Long.

Terry, T. L. **Fibroblastic overgrowth of persistent tunica vasculosa lentis in premature infants. 2. Clinical aspects.** Arch. of Ophth., 1943, v. 29, Jan., pp. 36-53; also Trans. Amer. Ophth. Soc., 1942, v. 40.

So-called persistent tunica vasculosa lentis, or a fibroblastic sheath behind the crystalline lens, occurs sporadically. Usually the condition is discovered a few days after birth in an infant born at full term, but the correct diagnosis is often not established until the eyes are examined pathologically after removal because of a clinical diagnosis of retinoblastoma. Almost invariably the condition is unilateral. In premature infants it evidently develops after birth, since in none of the author's seven or more cases was it noted before the age of four months.

These infants have shown the following abnormalities: (1) persistence of all or some part of the hyaloid vascular system (the remains may take the form either of vessels carrying blood or of parts of closed blood-vessel walls); (2) the presence of embryonic connective-tissue growth behind the crystalline lens; (3) persistence of the fetal character of the vitreous humor.

Special findings may represent any of the following groups: persistent pupillary membrane, tunica vasculosa lentis, hyaloid artery; congenital crowfoot-pigment on the lens, posterior synechia, cataract; Mittendorf dot; pseudopapilledema, glial projections, retinal folds from traction; microcornea, microlentia, microphthalmos, shallow anterior chamber. Glaucoma is a frequent complication.

Six cases are reported in detail. Treatment at present seems futile, but surgery, diathermy, and irradiation have been tried. (6 illustrations, including one color plate.)

Ralph W. Danielson.

Terry, T. L. **Fibroblastic overgrowth of persistent tunica vasculosa lentis in premature infants. 4. Etiologic factors.** Arch. of Ophth., 1943, v. 29, Jan., pp. 54-65; also Trans. Sec. on Ophth., Amer. Med. Assoc., 1942, 93rd mtg.

A search for the essential etiologic factor or factors causing fibroplasia, either in infants born prematurely or in infants born at full term, has been made with due regard to the possibility that the disease in its full development may represent the culmination of a vicious cycle initiated by an essential cause which was active for a limited and perhaps brief period.

Prematurity, often associated with twinning, is an important predisposing, but not invariably an essential, factor, and the degree of prematurity appears to influence the nature of the involvement. The factors considered are grouped as hereditary, prenatal, natal, and postnatal. The following variable factors of perhaps subsidiary importance are also discussed: cause of prematurity; use of new drugs; trauma or intraocular hemorrhage introducing

the process; incomplete homotherism; premature exposure to light; premature loss of certain materials, such as hormones, supplied through the placenta from the mother; incomplete digestion and assimilation of foodstuffs, causing for example a deficiency in riboflavin; and changes in the blood, such as premature establishment of the characteristic blood group of physiologic anemia of prematurity and erythroblastosis with differences in the RH factor.

The outstanding theoretic cause is a precocious increase in blood pressure brought on before the hyaloid artery and the tunica vasculosa lentis disappear, and initiated by such normal factors as adaptation to extrauterine life or such abnormal factors as patent ductus arteriosus, dehydration, or use of drugs. After the development of increased blood pressure, hypertrophy of the hyaloid arterial system takes place, causing persistence of fibrillary vitreous and growth of a support of embryonic connective tissue.

Ralph W. Danielson.

Wolfe, O., and Wolfe, R. M. **Hereditary cataracta caerulea.** Amer. Jour. Ophth., 1943, v. 26, April, pp. 404-406. (References.)

10

RETINA AND VITREOUS

Cohen, Martin. **Fundus oculi in hypertensive vascular disease.** Arch. of Ophth., 1943, v. 29, Jan., pp. 85-91.

This paper discusses the fundus findings in essential benign hypertension and in moderate and severe forms of malignant hypertension. Hypertensive disease is frequently associated with chronic glomerular nephritis, toxemia of pregnancy, diabetes, arteriosclerosis, and pyelonephritis. The fundus signs of hypertension may accompany the fundus lesions associated with those other diseases. If a patient is seen for the first time during the last stages of one of those diseases, it is impossible to judge from the eyegrounds which is the prevailing disease or in what order the changes occurred. However, angiospastic retinitis shows characteristic changes.

The indication for operative procedures for the reduction of hypertension rests on the clinical symptoms and not on the ophthalmoscopic findings. The prognosis for life depends on involvement of the vital organs and not on the fundus picture. (6 figures, 2 case reports.) Ralph W. Danielson.

Lijo Pavia, J. **Detachment, reattachment, tears, and cysts of the retina.** La Semana Med., 1943, v. 50, Jan. 14, pp. 97-103.

Eight months previously a woman aged 19 years had discovered that she had almost no vision in her right eye. Four months before this experience she had been examined in an eye clinic, without discovery of other anomaly than an error of refraction. A later examination, incidental to application for employment in a factory, led to a diagnosis of detachment of the retina, and she consulted the author on account of this diagnosis. There was no appreciable detachment in any retinal zone. There was, however, an evident cystoid degeneration of the macula. Four large vesicles were surrounded by an area, extending beyond the macula, which had the typical appearance of orange peel. A striking feature of the fundus was the presence of a number of lines of reattachment. One of these extended from the upper inner angle of the macular region, upward and outward,

following approximately the eleven o'clock meridian for six or seven disc diameters, and bifurcated at its distal extremity. At the nasal border of the disc there was a whitish halo, which continued into the second line of reattachment, the latter crossing the nasal half of the retina in the direction of the equator. The third line was seen two disc diameters below the fovea, extending horizontally more than five disc diameters. The fourth line of reattachment was situated below some retinal tears between the 10 and 11 o'clock meridians, approximately at the equator.

Lines or striae one and two limited temporally and below an extensive area characterized by marked atrophy of the pigmentary epithelium. Line three was interpreted as corresponding to a disinsertion of the ora serrata, and was therefore thought to mark the boundary of a possible lower detachment of the retina; whereas line number four was interpreted as bordering the group of tears in the upper outer sector.

A retinal cyst, oval in shape and measuring eight by five disc diameters, had its center on the eight o'clock meridian and straddled the equator, its proximal border being about eight disc diameters from the macula. The cyst had a depth of 6 D., its content being transparent and permitting observation of the choroidal blood vessels.

The author interpreted the general fundus picture as representing an old detachment with spontaneous reattachment and formation of a retinal cyst, tears being subsequently formed by traction. The disinsertion of the ora serrata, downward and outward, had also been spontaneously and completely delimited. The patient had a positive Wassermann, so that surgical intervention was excluded and antisyphilitic treatment was administered. Complete occlusion of the healthy eye was ordered, with partial occlusion of the affected eye by stenopeic spectacles, without rest in bed. Thirty-three days later the vision of the affected eye had risen from 1/100 to 1/37. Three months from the first examination the vision of the affected eye had improved to 1/10. (7 illustrations, references.)

W. H. Crisp.

11

OPTIC NERVE AND TOXIC AMBLYOPIAS

Argañaraz, Raul. **Optic neuritis of nasal origin and the oculo-orbital complications of sinusitis.** Arch. de Oft. de Buenos Aires, 1941, v. 16, Oct., p. 541.

The anatomic relations between the orbit and the paranasal sinuses are briefly reviewed. The author classifies the forms of sinusitis producing ocular complications into two groups: an anterior group, frontal-ethmoidal-maxillary; and a posterior group, sphenoethmoidal.

The anterior, frontal-ethmoidal-maxillary group usually gives rise to complications involving the orbital rim (periostitis), the orbital contents (orbital cellulitis and phlegmon), and the eyeball itself (iridocyclitis, retinal detachment).

The posterior, spheno-ethmoidal group generally causes optic neuritis and oculomotor and sensory paralyses. Very exceptionally it involves one single sinus, but polysinusitis is the rule. The sphenoidal sinusitis producing optic neuritis is usually a low-grade process, giving rise to few symptoms, and the nasal examination may be practically negative. The diagnosis can be confirmed only by X ray or by exploration of the sinus after surgical opening. The inflammation spreads from the

sphenoidal sinus to the optic nerve by direct continuity or through the fine anastomoses of venous plexuses. It is also possible for the sinus infection to cause an optico-chiasmal arachnoiditis through which the optic nerve becomes involved.

The typical campimetric sign of optic neuritis of nasal origin is enlargement of the blind spot. It is always present, and its absence eliminates the paranasal sinuses as an etiologic factor. The central scotoma is variable in size and intensity. Treatment is based on exact diagnosis. Local and systemic measures are briefly discussed. The surgical opening of the sphenoidal sinuses and the posterior ethmoidal cells should be carried out when visual loss continues in spite of other measures. (Visual field charts, illustrations.)

Plinio Montalván.

Chase, J. S. **Choked discs and other brain-tumor symptoms relieved by sphenoidectomy.** Med. Bull. Veterans Administr., 1942, v. 19, July, pp. 8-15.

The anatomic and pathologic relationships of the sphenoid sinus to the optic nerve are reviewed. The author reports a series of five cases in which papilledema with marked loss of vision, field defect, headache, and other symptoms of brain tumor was promptly relieved by sphenoidectomy. All of the patients had thorough neurologic examination with negative ventriculograms. The author concludes that all such patients should have early nasal examination and that exenteration of the posterior sinuses should be considered.

T. E. Sanders.

Longley, B. J., Clausen, N. M., and Tatum, A. L. **Experimental production of primary optic atrophy in monkeys by administration of organic arsenical compounds.** Jour. Pharmacol., and Exper. Therapeutics, 1942, v. 76, Nov., pp. 202-206.

In a series of monkeys blindness was produced by administration of the following compounds: atoxyl, tryparsamide, stovarsol, 3-amino-4-beta-hydroxyethyloxy-phenylarsonic acid (No. 190) and 4-beta (beta-hydroxy)-ethyloxy-phenylarsonic acid (no. 266); tryparsamid and stovarsol being the most toxic to the optic nerves. The drug administration was continued until the animals either died of toxicity or became blind. The blind animals all had a searching nystagmus and pallor of the optic discs which became apparent in four to six weeks. The part of the molecule responsible for the damage could not be determined. The histologic findings are to be described in a future report. T. E. Sanders.

Rodger, F. C. **Unilateral involvement of the optic nerve in head injuries.** Brit. Jour. Ophth., 1943, v. 27, Jan., pp. 23-33.

Twenty cases of unilateral optic-nerve atrophy are reviewed. Pallor of the disc was observed within about 17 days in the majority of cases in which the canalicular part of the nerve was affected. In three cases pallor became evident within seven days. In these, the injury was anterior to the canal and closer to the disc. Traumatism of the bony canal is not, however, the whole story in optic-nerve atrophy following injury. Subvaginal and intraneural hemorrhage are shown also to be factors. (One table, illustrations, references.) Edna M. Reynolds.

12

VISUAL TRACTS AND CENTERS

Erickson, T. C., Odom, G., and Stern, K. **Boeck's disease (sarcoid) of the cen-**

tral nervous system. Arch. Neurol., and Psychiatry, 1942, v. 48, Oct., p. 613.

The differential diagnosis in this case lay between a syphilitic or tuberculous lesion, on the one hand, and Boeck's sarcoid, on the other. Sarcoid of the central nervous system has been recognized with extreme rarity. The present case presented a clinical picture of adhesive arachnoiditis with internal hydrocephalus, due to blocking of the cerebrospinal-fluid channels about the foramen magnum. Suboccipital craniotomy was done, and biopsy specimens from the cerebellum and arachnoid showed a granulomatous process identical with that in specimens taken from a nodular lesion of the upper lip. Post-mortem microscopic examination showed foci made up of numerous epithelial cells, giant cells, round cells, and plasma cells. Similar lesions were observed in the lung. (13 references.) Ralph W. Danielson.

Heiman, Marcel. **Visual hallucination during paraldehyde addiction.** Jour. Nerv. and Mental Dis., 1942, v. 96, Sept., p. 251.

Hallucinations during the withdrawal period in paraldehyde addiction and in particular in two cases observed by the author are described and discussed. Comparisons are made with other drugs. Important objective ocular findings are enumerated.

Francis M. Crage.

McDonald, P. R. **Bilateral thrombosis of posterior calcarine arteries with sparing of macular vision.** Arch. of Ophth., 1943, v. 29, Jan., pp. 92-97.

Vascular accidents affecting the eye and the visual pathways are not uncommon, and the sequelae vary according to the extent and the site of the lesion. One may have paralysis of conjugate deviation, oculomotor palsies, or complete or incomplete homonymous defects in the visual fields. Hemianopsia of vascular origin is usually sudden in onset and is caused by embolus, thrombosis, or rupture of a vessel supplying the optic pathways or the visual cortex. Such defects are rather common, but the occurrence of bilateral hemianopsia with sparing of the macular field is rather rare.

The author reports the case of a 49-year-old man who at the first visit complained of inability to see to get around. He stated that two days previously, while talking to a neighbor, he had become completely blind for a few seconds; and that when his vision cleared he had the feeling he was looking through a narrow pipe. He had been well until 18 months previously, when he had had an attack of shortness of breath with pain over the heart and radiating down the left arm. A few days later he had noticed that he could not see to the right. His blood pressure was 150 systolic and 110 diastolic. Neurologic examination was negative except for bilateral restriction of the field to a narrow vertical strip at the macula. The fundus showed grade-1 hypertension. From the history it was concluded that there had occurred an embolus of the left posterior calcarine artery, and that this had been followed by thrombosis of the right posterior calcarine. (2 figures, 13 references.)

Ralph W. Danielson.

13

EYEBALL AND ORBIT

Appelbaum, A., and Marmelstein, M. **Congenital bilateral anophthalmos verus with unilateral polydactyly and cleft palate.** Arch. of Ophth., 1943, v. 29, Feb., pp. 258-265.

Anophthalmos is very difficult or im-

possible to differentiate clinically from microphthalmos. Collins and Parsons state that anophthalmos is the proper term to employ when there is complete failure of the essential nervous mechanism of the eyeball. If any of the nervous elements are present, no matter how imperfect, the condition is that of microphthalmos. Anophthalmos verus may be primary if one or both primary optic vesicles fail totally to bud out from the thalamencephalon. The secondary variety results from atrophy of the optic vesicles which have formed. The authors report the case of a two-year-old girl with bilateral anophthalmos verus associated with polydactylism of one hand, cleft palate, mental deficiency, and deaf-mutism. The lids, lashes, and conjunctival sacs were formed, but there were no lacrimal puncta. The orbits were surgically explored through conjunctival incisions. No blood vessels, nerves, or muscles could be found. The optic foramens seemed empty on probing. There is a general discussion of this condition, including the experimental production of anophthalmos verus in laboratory animals. John C. Long.

Argañaraz, Raul. **Optic neuritis of nasal origin and the oculo-orbital complications of sinusitis.** Arch. de. Oft. de Buenos Aires, 1941, v. 16, Oct., p. 541. (See Section 11, Optic nerve and toxic amblyopias.)

Berens, Conrad. **Restoration of the lower cul-de-sac.** Amer. Jour. Ophth., 1943, v. 26, Feb., pp. 119-121. (5 drawings.)

Burch, F. E. **Metastatic orbital infection.** Amer. Jour. Ophth., 1943, v. 26, March, pp. 253-260; also Trans. Amer. Ophth. Soc., 1942, v. 40. (One graph, references.)

Cunningham, J. C. **Unilateral exophthalmos caused by arteriovenous aneurysm.** Jour. Iowa State Med. Soc., 1942, v. 32, Nov., pp. 495-497.

Eight months previously, a woman of sixty years had slipped on an icy walk, striking her head. Since the injury she had fallen several times without apparent reason. A week before coming for examination, she had experienced a sudden severe stabbing pain behind the right eye. This was followed by a dull headache localized on the right side, as well as a swishing sound in the head synchronous with the heart beat. Next day the right eyelids became swollen and the patient experienced double vision.

At examination there was marked edema of the lids, right exophthalmos of 5 mm., complete paralysis of the right third, fourth, and sixth nerves, and complete ptosis of the right upper lid. With a stethoscope the bruit was audible over the right orbital area. The corrected vision of the right eye was 20/40, that of the left eye 20/20, and the right pupil was moderately dilated and sluggish to light. The tension of this eye was 30 mm. Schiötz. There was marked pulsation of the retinal veins, and the disc was slightly edematous.

A diagnosis of arteriovenous communication in the cavernous sinus having been made, the patient was put to bed and given a sedative, and was subjected to increasing digital pressure over the right common carotid artery for a period of two weeks. For two days the digital pressure produced an improvement in the symptoms, but on the fourth day, after four minutes of digital pressure, the patient developed a left partial hemiplegia, with a moderate degree of cyanosis and weak and rapid pulse. Within 12 hours there was

a good deal of improvement in the hemiplegia, but for the next two days the patient complained of numbness and tingling of the left arm and leg.

After this time, brief digital pressure over the right common carotid artery increased the sensory disturbances on the patient's left side. On the fourth day after the first attack of hemiplegia, she became semicomatose and the right common carotid artery was ligated under local anesthesia. Twelve hours later the patient developed a final hemiplegia. She died shortly afterward. At autopsy a large part of the right cerebral hemisphere, especially in the frontal and parietal regions, was found hemorrhagic and soft. There was a vascular aneurysm of the right internal carotid artery in its cavernous portion.

W. H. Crisp.

Donahue, H. C. **Metastatic panophthalmitis followed by retinal separation and recovery.** Amer. Jour. Ophth., 1943, v. 26, March, pp. 283-286.

Giqueaux, Roberto. **Varicocele of the orbit.** Anales Argentinos de Oft., 1942, v. 3, Jan., Feb., March, p. 25.

A man of twenty years had suffered injuries to the head from playing Rugby football four years before the examination. He had experienced a gradual onset of eye symptoms. In the vertical position there was a deep tarso-orbital fold, with 2 mm. of enophthalmos. After bending down, holding the nose, or compressing the jugular, there was a bulging above the eye with 2 mm. of exophthalmos of the left eye. Vision, motility of the eye, fields, and X ray of the orbit were all normal. There were no varicosities elsewhere in the body. The treatment recommended includes sclerosing solutions, X rays, extirpation of some of the varicosities, and bipolar electrolysis. The differential diagnosis is discussed. (One figure.) Eugene M. Blake.

Lopes, Octacilio. **Prolapse of the eyeball.** Arquivos Brasileiros de Oft., 1942, v. 5, Oct., pp. 258-266.

Two cases are described. A Brazilian Negress aged 25 years was seen on account of a syphilitic choroiditis. Incidental manipulation of the eyelids showed that two thirds of each eyeball was prolapsed beyond the line of the eyelids when the latter were drawn apart and pushed back rather forcibly by the examiner's fingers. No attempt was made to produce complete prolapse.

The second patient was a Negro aged 19 years, who came on account of conjunctival irritation, and in whom a very similar result was obtained from manipulation of the eyelids for examination of the cul-de-sac. (9 illustrations, bibliography.) W. H. Crisp.

MacNeal, W. J., Frisbee, F. C., and Blevins, A. **Bacteriophage therapy of staphylococcic septic obstruction of the cavernous sinus. 2. Case reports.** Arch. of Ophth., 1943, v. 29, March, pp. 341-368.

In this second article the authors present the case reports of 45 patients who gave evidence of an impending or well established septic obstruction of the cavernous sinus, including first, 14 patients who survived; second, 23 patients who died within five days after the initiation of bacteriophage therapy; and, third, 8 patients who succumbed after an interval varying from eight days to five months. In other words 31 percent survived the infection, 51 percent succumbed within five days, and 18 percent died after a prolonged illness. The recovery rate of 31 percent

in this series is not appreciably lower than that determined for the entire staphylococcemia series of 500 patients. Rapidly progressive phlegmonous inflammation of the face extending to the eye should be promptly diagnosed as malignant staphylococcic infection and should be treated as such immediately, pending confirmation or refutation of this diagnosis by bacteriologic studies. The patient should receive staphylococcus bacteriophage intravenously in a series of regularly spaced increasing doses until a chill results or until a total amount of 500 to 1,000 c.c. has been administered on the first day. Subsequently the bacteriophage should be injected at least twice daily until the patient appears normal, and then once daily for two weeks. It should then be administered once or twice a week for six months. Too early discontinuance of bacteriophage therapy may have contributed to some of the late deaths in the series. Prolonged bacteriophage therapy is earnestly recommended in cases of apparent recovery, in order to prevent recrudescence of the disease and various late complications, especially intracranial abscess. Sulfathiazole should be given promptly, 8 to 12 gm. on the first day and 4 to 8 gm. daily thereafter for 10 to 14 days. Use of this drug should then be discontinued because of the risk of toxic complications. In some of the patients considered here, treatment of facial furuncles by squeezing, by incision, or by irradiation seems to have been responsible for malignant extension of the infection. Gentle and conservative local care of such lesions is recommended. Surgical attack on the orbit, carotid artery, temporal bone, accessory air cavities, or intracranial structures should not be undertaken without most careful consideration of the risks involved. In general the surgeon with most mature experience in this field will be most conservative. (14 charts, references.)

Ralph W. Danielson.

MacNeal, W. J., Frisbee, F. C., and Blevins, A. **Thrombophlebitis of the cavernous sinus.** Arch. of Ophth., 1943, v. 29, Feb., pp. 231-257.

The cavernous sinus differs from the lateral and sigmoid sinuses in that it is more complex, consisting of a maze of venous channels and an irregular meshwork of fibrillar endothelium-lined tissue associated with a large artery and several nerves. This sinus may become obstructed either by extension of a completely obturating thrombus along a communicating vessel or by formation within the sinus of a clot due to a local edematous swelling. Septic obstruction occurs in association with infection of the middle and external ear, nose, paranasal sinuses, teeth, and jaws, and with abscesses, carbuncles, and furuncles about the head or neck. Local trauma to the primary lesion, operative or otherwise, increases the danger of extension into the cavernous sinus. While cavernous sinus thrombophlebitis is ordinarily a fatal disease, a number of recoveries have been reported. The authors summarize from the literature 58 cases of recovery. Most of these recoveries have occurred with expectant treatment, with bacteriophage therapy, and with the use of sulfonamides. The commonest causative organisms have been the hemolytic streptococcus and the staphylococcus. The authors state that they will later publish a series of original cases of septic thrombophlebitis.

John C. Long.

Martin, M. D., and Mabon, R. F. **Pulsating exophthalmos.** Jour. Amer. Med. Assoc., 1943, v. 121, Jan. 30, p. 330.

In a complete review of the literature since 1924 the authors found a total of 812 reported cases. They report five additional operative cases. They explain the development of such a condition on the basis of anatomic studies of the cavernous sinus, where we have the only example of a major artery within and forming part of a large venous channel. Any trauma or disease to the artery could cause an arteriovenous fistula. In view of the progress of the disease, early treatment in the form of ligation of the carotid artery should be undertaken before extensive proptosis develops. Surgical treatment is beneficial, although in many cases there is only slight improvement and sometimes no change. At present there is no satisfactory direct operation for obliterating the fistula. (Discussion, 6 figures.) George H. Stine.

Reese, A. B. **Exophthalmos associated with thyroid disease.** New York State Jour. Med., 1942, v. 42, Oct. 1, p. 1848.

The author reviews the pertinent recent literature by Naffziger, Smelser, Friedgood, Marine, Rosen, and Reese, and arrives at the following conclusions: (1) Hyperthyroidism and exophthalmos both stem from a common cause, namely, a disturbance in the anterior lobe of the pituitary gland. (2) The cause of malignant exophthalmos is abnormal hyperactivity of the anterior lobe of the pituitary gland, combined with postoperative reduction in the function of the thyroid gland. (3) The prolapse of the lacrimal gland in patients with exophthalmic goiter and the tearing which these patients experience is due to a dacryoadenitis comparable to the myositis of the extraocular muscles. (4) As the exophthalmos is due directly to the thyrotropic hormone in the anterior lobe of the pituitary and the thyroid plays only a secondary role, it is possible to have this type of exophthalmos without hyperthyroidism.

In accordance with the above theories, the author makes the following suggestions for treatment: (1) In hyperthyroidism in which retraction of the upper lid, and not exophthalmos, is the principal cause of disfigurement, and the duration of the condition indicates that it has reached an end stage, the appearance of the patient may be helped a great deal by recession of the levator palpebrae muscle. (2) When exophthalmos is the dominant factor in the patient's appearance and the duration indicates that the condition has reached an end stage, the appearance of the patient may be improved greatly by tarsorrhaphy at the external canthus. (3) When exophthalmos and retraction of the upper lid are both factors in the disfigurement, then recession of the levator and external canthal tarsorrhaphy may be done. (4) If exposure of the cornea seems imminent and the condition is not an aggravated form of malignant exophthalmos, operative creation of permanent adhesions of the lid margins will prevent exposure of the cornea. These adhesions should be left for a year or longer in the hope that there will be some regression of the exophthalmos. (5) When malignant exophthalmos is present, and exposure of the cornea followed by ulcer and possible loss of the eye is imminent, decompression of the roof and lateral wall

of the orbit through a transfrontal approach (Naffziger's operation) is indicated. (6 references.)

Ralph W. Danielson.

Thacker, E. A., and Gillespie, J. B. **Osteomyelitis of the frontal bone and orbital abscess following sinusitis.** Arch. of Pediatrics, 1942, v. 59, Sept., 574.

The authors give a complete discussion of the literature on the subject, stressing the high mortality. They then report in detail a case of progressive osteomyelitis developing subsequent to fronto-ethmoid sinusitis in a child of six years—the youngest ever reported. The disease developed to the accompaniment of only slightly elevated temperature and with little change in the blood picture. A pitting tumor over the frontal region was the first clinical evidence of osteomyelitis and the defect in the outer plate was palpable. Headache was surprisingly minimal. Even though the pansinusitis was staphylococcic, prolonged treatment with sulfathiazole did not prevent occurrence of osteomyelitis. Previous to this frontal involvement an orbital abscess had developed and had been cleared up by antral irrigations, amputation of the anterior end of each middle turbinate, and external drainage. If radical surgery had been done on the sinuses, it would undoubtedly have been considered the cause of the osteomyelitis. (44 references.) Ralph W. Danielson.

Torres Estrada, Antonio. **New insert for improvement of ocular prothesis.** Bol. del Hosp. Oft. de Ntra. Sra. de la Luz, 1941, v. 1, July-Aug.-Sept.-Oct., pp. 248-257.

After incising the cornea and eviscerating the globe, two long flaps are cut from the sclera, each about 5 mm. wide by 15 mm. long. The one is made by a 5-mm. curved incision vertically from the upper limbus, continued into a 15-mm. line running parallel with the limbus and 5 mm. distant from it; and the other by a similar short incision vertically down from the lower limbus, continued into a 15-mm. line running parallel with the limbus on the opposite side of the eyeball.

After inserting the fat prothesis, the two long flaps are sutured together along their sides, to form a broad bridge across the gap where the cornea used to be. The conjunctiva is closed with the usual "purse string." (9 illustrations.) W. H. Crisp.

Turner, F. W., and Krause, A. C. **The role of iron, copper, zinc, and manganese in the metabolism of the ocular tissues, with special reference to the lens.** Amer. Jour. Ophth., 1943, v. 26, March, pp. 260-266. (4 tables, references.)

14

EYELIDS AND LACRIMAL APPARATUS

Bangerter, A. **An instrument which simplifies suture of the mucous membrane in dacryocystorhinostomy.** Ophthalmologica, 1942, v. 104, Sept., pp. 171-174.

The author describes a series of three needles which facilitate the placing of sutures in the mucosa. Each is a thin metal rod the end of which is flattened, sharpened, perforated, and bent at an angle. In one the angle is a right angle; in one it is obtuse; in the third, acute. All are used in a handle in which they are secured by a miniature drill chuck.

F. Herbert Haessler.

Bender, M. B. **Eyelid closure reaction.** Arch. of Ophth., 1943, v. 29, March, pp. 435-440. (See Section 7,

Uveal tract, sympathetic disease, and aqueous humor.)

Berkley, W. L. **Vaccinia of the eyelids.** United States Naval Med. Bull., 1942, v. 40, Oct., p. 970.

Three cases of vaccinia of the eyelids are reported. Sulfanilamide therapy is advised. Recommendations for reducing the number of such accidents are given. Gertrude S. Hausmann.

Coutts, W. E., and Brieva, I. **Inclusions, cytoplasmic, and free—of the Miyagawa type—in the lacrimal sac.** Rev. Chilena de Higiene y Med. Preventiva, 1942, v. 5, June, pp. 3-4.

Two extirpated sacs were studied microscopically as to the presence of such inclusions. One showed a granulomatous lesion, hyperplastic and in a lesser degree fibrosing, with slight epithelial hyperplasia of the lining of the sac. There was a tendency to stenosis and there were intracytoplastic and extracytoplastic granular cells similar to those observed in other lymphogranulomatous lesions. The second case also showed granulomatous lesions and hyperplasia with the characters which are observed in lymphogranuloma venereum. These pathologic changes confirm an opinion which has existed for some time, and taken with the lymphogranulomatous nature of certain corneal ulcers, demonstrated recently by Meyer and Reber, justify the belief that the virus of this disease plays an important part in the genesis of numerous ocular syndromes. (References.) W. H. Crisp.

Johnstone, I. L. **A case of deficiency of the malar bones with defect of the lower lids.** Brit. Jour. Ophth., 1943, v. 27, Jan., pp. 21-23.

A case of deficiency of the malar bones with defect of the lower lids in a boy of 14 years is described and illustrated by photographs. Excision of a triangular piece of tissue from the lower lid was unsatisfactory, and a sliding graft from the cheek gave only slight improvement. A pedicle graft from the upper lid gave a fairly satisfactory result, and no transplantation of cartilage was necessary. X-rays showed poor development of both zygomata. (5 illustrations.)

Edna M. Reynolds.

Kilner, T. P. **Deficiency of the malar bones with defect of the lower lids.** Brit. Jour. Ophth., 1943, v. 27, Jan., p. 13.

Beside the deficiency of the malar bones, there was a cleft soft palate, defective ear development, and no external auditory meatus on either side. The palate defect was repaired at the age of 14 months, and plastic surgery of the eyelids and ears was done when the child was six years old. A triangular skin flap was transposed from the upper eyelid across the outer canthus on each side, and cartilage implant will later be used to fill out the depressions in the outer parts of the infraorbital margins. (Multiple illustration, references.)

Edna M. Reynolds.

Linksz, Arthur. **Applied pharmacology of the skin in the ophthalmologist's everyday practice.** Arch. of Ophth., 1942, v. 28, Dec., pp. 959-982.

The skin is lubricated and protected by an emulsion of sweat and sebum. Variations in the amount and character of this emulsion determine whether a skin is "oily" or "dry." Age and the activity of the sex glands influence the secretion of the sebaceous glands and hence the protective emulsion. The

character of the skin must be considered in therapy. The author discusses the practical application of many types of therapeutic agents to the skin with special reference to the eyelids. Cleansing agents, powders, lotions, cold creams, pastes, ointments, counter-irritants, and so on are considered with formulae and suggestions for their application.

Eyelash dyes and other cosmetic preparations for use around the eyes are discussed. Physical methods of coloring the lashes by the application of colored inert substances seem innocuous. Dyeing with mineral salts or analine preparations may at times be very dangerous, especially in hypersensitive individuals. In comparison with the enormous dissemination of the use of dyes, the number of reported injuries is extremely small. (Bibliography.) John C. Long.

Mann, Ida. **Deficiency of the malar bones with defect of the lower lids.** Brit. Jour. Ophth., 1943, v. 27, Jan., p. 13.

Following are the outstanding features of the case presented: (1) normal upper lids drooping at the outer ends; (2) congenital notching of lower lids without marginal differentiation, lashes, or meibomian glands; (3) no ocular defect; (4) depression of cheek with defective lower bony margin of orbit; (5) deafness; (6) narrow upper jaw with abnormal spacing of the teeth.

The embryologic significance of the case is that, although there was no defect in the paraxial mesoderm, an arrest of development in the maxillary mesoderm occurred at or before the end of the second month.

Edna M. Reynolds.

Smith, J. E., and Siniscal, A. A. **Modified Ewing operation for cicatricial entropion.** Amer. Jour. Ophth., 1943, v. 26, April, pp. 382-389. (6 drawings, references.)

Turner, N. K. **Dacryolithiasis with stricture of the lacrimal ducts.** Virginia Med. Monthly, 1942, v. 69, March, p. 151.

The author describes a patient aged 16 years who complained of constant epiphora. After probing the ducts 11 small stones were removed from the upper and five from the lower canaliculus. The symptoms were entirely relieved. Theodore M. Shapira.

Urrets Zavalia, A., and Obregon Oliva, R. **Contribution to the literature on Marcus Gunn's phenomenon.** Arch. de Oft. de Buenos Aires, 1941, v. 16, November, p. 601.

The authors review in detail Marcus Gunn's syndrome, characterized by moderate ptosis of the upper lid with widening of the palpebral fissure during mastication or movements of the lower jaw. They report their observations in five cases affected with this condition: four females and one male. The condition was congenital in all the cases, and two of them showed moderate miosis on the affected side.

Although cosmetically this anomaly may be a handicap, treatment has attracted little attention, and most of the operations proposed have been directed to correction of the ptosis alone. In one case, however, in which the phenomenon appeared exclusively during lateral displacement of the lower jaw to the left, the authors sectioned the motor root of the third branch of the V nerve, with complete disappearance of the anomaly. (Photographs, bibliography.) Plinio Montalván.

Valle, Donato. **Dacryostomy and canaliculorhinostomy.** Arquivos Brasileiros de Oft., 1942, v. 5, Oct., pp. 236-251.

The author's technique is based upon that of Dupuy-Dutemps as modified by Bourguet. The initial incision needs to be not more than 2 cm. long. After separating the periosteum in the direction of the dorsum of the nose, the periosteum is separated from the deep fascia, leaving the lacrimal fossa completely in view. Through the lower canaliculi a Bowman probe is carried to the point of touching the periosteal wall, and at the latter point an incision is made as in opening the internal wall of the lacrimal sac. A rectangular opening is made in the internal bony wall, sufficiently large to permit the formation of flaps of the nasal mucosa, which may be sutured to those formed by the deep fascia or by the remains of the wall of the lacrimal sac. Results in 135 cases are summarized. (One illustration, bibliography.) W. H. Crisp.

15

TUMORS

Cashell, G. T. W. **A case of orbital angioma.** Trans. Ophth. Soc. United Kingdom, 1941, v. 61, p. 145.

A woman 43 years of age gave a history of proptosis of the left eye for twenty years, gradually increasing during the last 12 years. A diagnosis of toxic thyroid had been made, and iodine had been taken internally. The patient came for this examination because while sitting at lunch the left eye had suddenly become dislocated forward, much to the consternation of the relatives, although the patient herself had not noticed anything much except that the vision became blurred. The eye was easily replaced. Upon examination a diagnosis of vascular tumor was made. At operation an encapsulated dark tumor mass was removed from outside the muscle cone. The pathologic diagnosis was of encapsulated cavernous hemangioma (½ by ¾ in.) with pigmentation of hematogenous origin. The final vision was 6/6 partly, with a very small scotoma adjacent to the fixation point. Beulah Cushman.

Crawford, T., King, E. F., and Rodgers, H. W. **Hemangioma of the orbit, removed by operation.** Brit. Jour. Ophth., 1943, v. 27, Feb., pp. 61-68.

The symptoms presented by the patient, who was under observation for two years, were: numbness and neuralgic pain around the eye, unaccompanied by any sensory changes; evidence of pressure on the optic nerve, reflected in loss of the peripheral nasal visual field; proptosis; and failure of vision. A diagnosis of slowly growing tumor of the orbit within the cone of muscles was made, and surgical exploration was done. The tumor was found in close apposition to the optic nerve but not attached to it. Injury to the nerves supplying the iris, ciliary body, and lateral rectus was an unfortunate sequel to the operation, but the proptosis was entirely relieved, the visual field was full, and there was very slight permanent disfigurement.

The tumor was found to be a mixed capillary and cavernous hemangioma arising from the blood vessels lying among the orbital fatty tissues. (2 fields, 4 illustrations.)

Edna M. Reynolds.

Greeves, R. A. **Choroidal sarcoma at the macula.** Trans. Ophth. Soc. United Kingdom, 1941, v. 61, p. 123.

A report of the growth of a sarcoma at the macula, in a physician aged 58 years whose hyperopic correction of 0.75 D. with normal vision had been observed for six years. The hyperopic correction then increased to 3.00 D., with normal visual acuity but some distortion. No fundus disturbance could be seen. A year later vision was reduced to 6/9. An area of fine pigmentary disturbance had appeared, and the hypermetropia was now 3.75 D. The diagnosis of choroidal sarcoma was partly based on the fact that the central vision remained better than it could have been with separation of the rods and cones from the choriocapillaris by exudate. The eye was removed two years after making the diagnosis. At this time central vision was gone, and a retinal detachment was present below.

A typical spindle-cell sarcoma was found, with practically no pigment. The absence of pigment was striking, as the patient was dark-complexioned, and the remainder of the choroid contained plenty of pigment. The macular area was edematous, and there was a shallow detachment. The internal nuclear layer was most affected, showing numerous lacunae. Henle's layer showed comparatively little involvement. Beulah Cushman.

Howes, W. E., and Camiel, M. R. **Contact roentgen therapy in superficial malignant lesions about the eye.** Arch. of Ophth., 1943, v. 29, Feb., pp. 224-230.

The authors describe a fairly recent development in roentgen therapy. The introduction of shock-proof "contact therapy" units has helped to solve many of the problems in the treatment of superficial malignant lesions around the eye. The new apparatus consists of a tube fitted into a compact shock-proof metal cylinder, the rays emerging from one end like the light from a flashlight. The target is only 1.8 cm. from the face of the tube. Consequently, when the tube is brought into direct contact with the lesion, the target-to-skin distance is only 1.8 cm.

By virtue of the inverse-square law, the intensity of radiation at the lesion is far greater than with the conventional types of apparatus, which are used at a target-skin distance of 30 to 50 cm. There is very little effect deep in the tissues, since the intensity falls off rapidly as the distance increase. The distribution of effect approximates qualitatively that obtained with surface or interstitial use of radium, but the rate of delivery of energy is much higher. Superficial basal-cell carcinoma may be destroyed in less than sixty seconds.

The results obtained in the treatment of lesions around the eye are discussed. Many of these were cured by doses of 10,000 to 13,000 r applied at one sitting. The accurately localized effect of this type of therapy makes it ideal for the treatment of lesions of the lid and surrounding structures. John C. Long.

Law, F. W. **Squamous-celled carcinoma of the conjunctival surface of the lid.** Trans. Ophth. Soc. United Kingdom, 1941, v. 61, p. 83.

A patient 69 years of age had an ulcerated area on the conjunctival surface of the left upper lid. On section the 6-mm. lesion was midway between the lid margin and the upper border of the tarsal plate. It was found to lie upon a squamous-cell carcinoma not connected with the skin, which was freely movable over it. It was not connected with the intermarginal layer or a meibomian duct. Beulah Cushman.

McRae, Alex. **Angioma of retina treated by operation.** Trans. Ophth.

Soc. United Kingdom, 1941, v. 61, p. 234.

A woman aged 27 years had lost the vision of the right eye suddenly in 1936, and in the same year a subtemporal decompression had been done for intracranial pressure. In 1939 the left corrected vision was reduced to 6/9 and the visual field was contracted. There were two angiomata above and below which were treated with diathermy and katholysis according to Stallard's technique. The larger tumor was treated twice and the smaller one once. Several weeks later the two tumor regions were visible as pink areas surrounded by scar tissue and the nutrient vessels were of normal size.

Beulah Cushman.

Picena, J. P., and Paëz Allende, F. **An achromatic melanoma of the choroid.** Ophth. Ibero-Amer., 1942, v. 4, no. 2, pp. 125-133 (in Portuguese) and pp. 133-140 (in English).

A choroidal sarcoma close to the optic disc had elements of neuroidal type in a syncytial area, showing at various points its melanoblastic developmental potentiality. The cellular proliferation was exuberant, without organization or orderly arrangement. There had been no recurrence 3½ months after enucleation. The general theories of development of such tumors are discussed. W. H. Crisp.

Queiroz, S., and Sales, M. **Retinal tumors of infancy.** Arquivos do Inst. Penido Burnier, 1942, v. 6, July, pp. 355-366.

Statistical, clinical, and microscopic details are reviewed with regard to 51 cases. (2 graphs, 4 photomicrographs, references.

Sherman, A. R. **Teratoid tumor of conjunctiva and other developmental anomalies with naevus verrucosus of scalp.** Arch. of Ophth., 1943, v. 29, March, pp. 441-445.

An 18-year-old boy stated that since birth he had had a growth in the scalp and red lumps in the left eye. In the scalp was an area 3.5 by 12 cm., consisting of dozens of closely packed warty nodules, diagnosed as naevus verrucosus. In the bulbar conjunctiva of the right eye, and in the conjunctiva and on the temporal two-thirds of the cornea of the left eye were fleshy, nodular, vascular masses. Biopsy of a nodule from the left eye led to an interpretation of teratoma. Cases are cited from the literature of subconjunctival teratoid tumors, most of which were osteomas. The nature of nevi and their relationship to neurofibromatosis is discussed. (18 references, 3 illustrations.)

Ralph W. Danielson.

Stevenson, D. S., and Rannie, I. **A case of chloroma.** Glasgow Med. Jour., 1942, v. 138, Aug., p. 47.

The authors report a case of chloroma of 18 weeks duration in a ten-year-old boy. The first symptoms were puffiness of the eyelids and proptosis of the left eye. Post mortem showed a firm tumor, of almond-green color on first exposure, fading to a pale greenish-yellow. It seems probable that the tumor started in the sphenoid, spreading to both orbits and into the left maxilla. Gertrude S. Hausmann.

Stough, J. T. **Melanosarcomata of the lid margin and conjunctiva.** Texas State Jour. Med., 1942, v. 37, Feb., p. 675.

A negro woman aged 39 years had had a small black spot on the temporal side of the right eyeball since childhood. For the past six months it had been showing an increase in size. Examination showed a black papillo-

matoid infiltration, with thickened plaques and masses, almost surrounding the cornea and encroaching on it nasally and temporally. The growth extended downward into the fornix, where it was continuous with a firm subconjunctival mass, 8 mm. in diameter, which prolapsed when the lower lid was everted. The conjunctiva was widely dissected, and the eyeball enucleated. There was no subsequent evidence of extension or metastasis.

Microscopic study showed a very heavily pigmented malignant melanoma, predominantly epithelioid, with some single cells of type B. It was subsequently learned that a limited conjunctival excision had been performed elsewhere about nine months before the operation described above.

The author's second patient, a woman of 57 years, had been born with a melanotic nodule on the right lower-lid margin. This showed no tendency to growth until it was injured on January 1, 1939, after which it grew rapidly. Partial excision of the growth with the electric knife was performed 8½ months after the injury. Pathological examination showed the growth to consist largely of epithelioid cells with a low argyrophyle-fiber content. There was a suggestion of metastasis to the preauricular gland and to the mucous membranes of the nasal sinuses. Exenteration was performed ten months after the injury. At the time of report the patient showed various indications of more extensive metastasis and was in serious condition. (2 illustrations, references.) W. H. Crisp.

16

INJURIES

Blake, E. M. **Eye injuries.** Connecticut State Med. Jour., 1942, v. 6, Sept., 716.

In addition to a practical discussion of the usual treatments of ordinary eye injuries the author adds a few paragraphs regarding chemical injuries from war gases. The gases whose primary purpose is to put the eyes temporarily out of commission are the lacrimators. and the symptoms may vary from redness, photophobia, and lacrimation to more severe burns caused by the liquid chemical. Even the milder cases may result in marked mental depression, caused by inability to keep the eyes open and by the fear of blindness. The eyes should be irrigated with 2-percent sodium bicarbonate and a local anesthetic, and the lids held open to demonstrate that vision is not lost.

The second group of gases, the blistering agents, mustard gas and lewisite, do the greatest harm, causing eye symptoms in dilutions as low as one to 10,000,000 parts of air. The symptoms may be delayed two to four hours. The treatment of mustard-gas burns has been divided into three stages; impregnation, burn, and subsidence. Since the penetration of mustard gas is practically instantaneous we can rarely treat the patient in the first stage, but water should be used copiously as early as possible. Irrigation with 2-percent bicarbonate of soda is effective; otherwise the usual treatment of a burn of the eye is given. Vesicles must be treated with care, for the contained fluid will burn other areas by contact. Lewisite burns are treated the same way as those due to mustard gas. Hydrogen peroxide was originally recommended, but has been found ineffective.

Burns of the eyelids are not treated with tannic acid, because of the risk of contracture. Instead the author recommends use of 1 percent gentian violet

and 10 percent silver nitrate, which gives a soft pliable scar.

Ralph W. Danielson.

Courcy, T. L. de. **A case of mustard-gas keratitis under constant observation for a period of twenty years.** Brit. Jour. Ophth., 1943, v. 27, Feb., pp. 54-60.

Subjective symptoms occurred in 1922, four years after the patient was gassed. Rapid changes in refraction occurred from 1922 to 1925. Anesthesia of the cornea was first noted in 1924 but was probably present from the time of injury (1918). Corneal ulceration began seven years after the patient was gassed and recurred at intervals for the next twelve years. Moderate vascularization accompanied these attacks.

The author found that carbolizing the ulcers did definite harm and that drugs such as atropine, dionin, quinine, and zinc applied in their usual strength acted as sources of irritation. Locke's solution was found to be the best means of local treatment. Tarsorrhaphy proved diasappointing. Short-wave diathermy gave undoubted benefit. Contact glasses gave protection to the corneas and increased the visual acuity. Peritomy brought about the disappearance of blood vessels in the pupillary areas. After twenty adventurous years, the patient now leads a practically normal social and business life.

Edna M. Reynolds.

Duthie, O. M. **Ocular injuries resulting from the war.** Trans. Ophth. Soc. United Kingdom, 1941, v. 61, p. 31.

Fifty cases of ocular war injury were treated by the author, who gives a general survey of the problems involved. Injuries to the orbit were usually from the entry of foreign bodies. If causing no trouble they should be left alone, as they may remain quiescent throughout life. A persistent sinus requires attention, and operation should be undertaken after careful survey by X ray. Fractures of the middle third of the face and including the orbits were not uncommon.

Lid injuries were frequently associated with general burns of the face. "Tanning" procedures were used to great advantage on the face but could not be used on the lids. Here the author found the use of gentian violet and silver nitrate to give the best results. Concussion arose from blasts, direct blows on the eye, blows on the bones of the face or orbit, and foreign bodies traversing the orbit. Concussion may produce rupture of pupil margin, iridodialysis, cataract, intraocular hemorrhage, rupture of the choroid, or evulsion of the optic nerve.

Rupture of the globe was the most frequent serious injury and resulted from flying splinters. A family of five were bombed while in a wooden sports pavilion which contained a great deal of glass. One child had been killed, and three presented extensive bilateral eye injuries due to flying glass. The cases were trimmed up and conjunctival flaps devised according to need. The final result was two shrunken eyes, one enucleated, one with perception of light, one of hand movements, and one rather better. All were removed to the hospital for the blind.

Foreign bodies in the eye were frequently nonmagnetic. Enucleation was immediately performed if such cardinal symptoms of sympathetic disease were present as cyclitis, lowered tension in the exciting eye, sympathetic irritation in the other eye, and increase of the mononuclear count. The author recommends transference of cases of eye in-

jury to hospitals with special ophthalmic units. Beulah Cushman.

Flynn, A. **Photoretinitis in anti-aircraft lookouts.** Med. Jour. Australia, 1942, v. 2, Oct. 31, pp. 400-401.

The author reports four cases of photoretinitis in seamen on anti-aircraft lookout duty who gave a history of having gazed directly into the sun. The reduced vision varied from 6/20 to 6/30 and was permanent. This was due to a thermal lesion at the macula which gave rise to a permanent scar and central scotoma. The condition should be distinguished from photo-ophthalmia which is an ultraviolet burn of the anterior part of the eye. The author advices the use of Crookes B 2 glasses as filters. In the above cases, either the protection was inadequate or in the excitement of action the glasses were not used. The necessity of using adequate protection should be stressed to all personnel exposed.

T. E. Sanders.

Gulliver, F. D. **Particles of steel within the globe of the eye.** Arch. of Ophth., 1942, v. 28, Nov., p. 896.

This is a résumé of the author's experience in the treatment of more than 1,800 intraocular foreign-body cases. All but ten of the foreign bodies were steel. Eighty percent of the particles originated from the mushroomed edge of a cold chisel, a steel drill, or a steel hammer. The use of tools with mushroomed edges is strongly condemned. Often the diagnosis of intraocular steel cannot be made without the use of X ray. In only 65 percent of the cases was it possible to find the wound of entrance. It is recommended that any eye suffering from an inflammation that cannot be accounted for by the usual diagnostic methods be subjected to an X-ray examination for foreign body. Methods of extraction are discussed. Foreign bodies in the vitreous chamber are best removed by first pulling them into the anterior chamber with the giant magnet. The particle is then removed through a small keratome incision. In only six cases did the author find it necessary to open the sclera. The results of operative removal were much better than in other reported series. In 2 percent of the eyes the initial injury irreparably destroyed the sight. Total or partial lens opacities occurred in 15 to 20 percent of the cases. Four percent became seriously infected before removal of the foreign body. One percent of the particles presumably magnetic could not be removed. Excluding the cases in which the original injury destroyed sight and those cases in which the particle could not be removed, the author reports that normal to slightly subnormal vision was retained in from 80 to 90 percent.

John C. Long.

Harding, G. F. **Instrument for removal of foreign body from cornea.** Arch. of Ophth., 1943, v. 29, Jan. p. 134.

This very simple instrument consists merely of a hypodermic needle to which is fitted a hollow, chrome-plated brass handle. The needle can be resharpened and is to be sterilized by boiling, not by antiseptic solutions such as are frequently used for corneal spuds. Any desired type of handle may be used. (The abstractor has tested the idea and likes it.)

Ralph W. Danielson.

Linksz, Arthur. **Applied pharmacology of the skin in the ophthalmologist's everyday practice.** Arch. of Ophth., 1942, v. 28, Dec., pp. 959-982. (See Sec-

tion 14, Eyelids and lacrimal apparatus.)

Parsons, John. **Protection of the eyes from war.** Trans. Ophth. Soc. United Kingdom, 1941, v. 61, p. 157.

Final statistics to date in relation to casualties in the World War of 1914-1918 show the percentage of awards for blindness in England to be not more than 0.27 percent and according to Canada's records 0.13 percent. In the present war, of 4,132 battle casualties admitted during the Dunkirk evacuation, 98 suffered from eye injuries. Of these 30 had foreign bodies lodged in one eye, and the remaining 68 suffered from contusion of the eyeball. Eye injuries thus formed 2.4 percent. Only four of the injured soldiers were known to be completely blinded. The final analysis of a greater number of statistics indicates that the number of cases of total blindness is in the region of 0.1 to 0.15 percent.

The Military Personnel Research Committee investigated eye protectors as to their effect upon visual acuity, depth perception, field of vision, dark adaptation, transmission of light, spotting test for searchlight operators, and penetration. Metal visors have much to recommend them, but plastic materials seem more suitable to prevent glare, protect from missiles and gas, and permit the best possible vision under all circumstances.

Beulah Cushman.

Pimentel, P. C., and Lech, Jr. **Ocular injuries.** Arquivos do Inst. Penido Burnier, 1942, v. 6, July, pp. 306-349.

In part one, graphs and statistical tables deal with the localization of corneal foreign bodies and of intraocular fragments, the causes of accident, the ages of the patients, nationality (all in Brazil), length of time the occupation has been practiced, extent of disability in relation to causation, and visual outcome. Part two deals with legislation and executive orders under Brazilian authority.

This is a 44-page report presented to the Fourth Brazilian Congress of Ophthalmology, Rio de Janeiro, 1941. (17 graphs, many tables.) W. H. Crisp.

Pittar, C. A. **A case of "hole" at macula due to looking at the sun.** Brit. Jour. Ophth., 1943, v. 27, Jan., pp. 36-38.

A typical case of "hole at the macula" caused by looking at the sun is reported in a gunner who had on several occasions sighted planes flying between him and the sun. (References.)

Edna M. Reynolds.

Soudakoff, P. S. **Concerning Lagrange's law of indirect ocular war injuries.** Amer. Jour. Ophth., 1943, v. 26, March, pp. 293-296. (References.)

Vila Ortiz, J. M. **Near vision in the estimation of incapacity from occupational eye injuries.** Anales Argentinos de Oft., 1942, v. 3, Jan., Feb., March, p. 11.

The writer cites numerous instances of great discrepancy between the ocular injury and the compensation awarded. The French standard and that of the United States are discussed. The author finds the method of computing compensation adopted by the American Medical Association in 1932 more just than the one used in Argentina and recommends its adoption there. (5 figures.) Eugene M. Blake.

Zuckerman, S. **Ocular injuries resulting from the war.** Trans. Ophth. Soc. United Kingdom, 1941, v. 61, p. 45.

During air raids the eyes may be injured by bomb splinters, flame of explosion or of subsequent fires, secondary missiles (including grit, sand, dust, glass, and even paper), and direct trauma incident to falls. The only surprise in the final tabulation was that eye injuries were so relatively rare. In a total of 94 incidents 4,500 people were exposed to risk. Of these 151 were killed, 74 seriously injured, and 320 slightly injured. Eye injuries were observed in only 32 (0.7 percent) of those injured.

Experiment showed that protection of the eyes from flying bomb splinters could be obtained only with heavy steel visors. The size, weight, and difficulty of supply rendered these less advantageous than the eye shield which is issued for protection against mustard gas. Ocular injuries secondary to blast were associated with sudden retrobulbar hemorrhage. This was also demonstrated in experimental studies.

Beulah Cushman.

17

SYSTEMIC DISEASES AND PARASITES

Anastassoff, S. A. **On ocular inflammation of focal origin.** Ophthalmologica, 1942, v. 104, Sept., pp. 136-156.

In twenty pages of text the author discusses the concept of focal infection and reports on his clinical experiments with six cases of iridocyclitis and two of episcleritis. Of the uveal inflammations four had their origin in dental infections, one in the tonsil, and one in the prostate. In the two cases of episcleritis the infection was presumed to have originated in the tonsil. Applying the technique of Rosenow the author was able to produce in animals an iridocyclitis and an immature cataract. Being unable to isolate specific agents by culture, he assumes that the inflammations were toxic in origin. (Bibliography.)

F. Herbert Haessler.

Baer, A. J. **The vitamins in ophthalmology.** Amer. Jour. Ophth., 1943, v. 26, March, pp. 286-291. (Bibliography.)

Bahn, C. A. **The psychoneurotic factor in ophthalmic practice.** Amer. Jour. Ophth., 1943, v. 26, April. pp. 369-378. (One table, 1 figure, 1 reference.)

Benedict, W. L. **Multiple sclerosis as an etiologic factor in retrobulbar neuritis.** Arch. of Ophth., 1942, v. 28, Dec., pp. 988-995. (See Section 11, Optic nerve and toxic amblyopias.)

Berens, Conrad. **Aging process in eye and adnexa.** Arch. of Ophth., 1943, v. 29, Feb., pp. 171-209; also Trans. Sec. on Ophth., Amer. Med. Assoc., 1942, 93rd mtg.

The changes occurring in the eye as the result of senescence have become of greater importance with the increasing life expectancy of the population. Many of the serious visual disorders attributed to age are degenerative processes resulting from failure of the vascular system. Although abiotrophies are of considerable importance, the author believes that many processes ordinarily ascribed to aging are the direct or indirect result of infection. The changes occurring in the orbit, conjunctiva, Tenon's capsule, accommodative apparatus, sclera, cornea, anterior and posterior chamber, iris, and retina are discussed. Senile macular chorioretinitis is described, following the classification of de Schweinitz. While treatment for this disorder is commonly considered useless, elimination of infections and the avoidance of tobacco and alcohol seem indicated.

Although cataract is commonly observed in old age, it is questionable whether age is the important factor. Age alone is certainly no contraindication to successful cataract surgery. Focal infection may play a part in the formation of cataract even though the eye may show no evidence of inflammation. Although there is no reliable method of absorbing lens opacities, improved general health and stimulation of the local circulation seem to retard the progress of some cataracts. Overfatigue, with resulting toxic disturbances, may be an important factor in the production of certain senile states. Hygienic living, with adequate rest, sleep, sunshine, fresh air and vitamin intake, along with suitable exercise, is regarded by the author as probably beneficial in delaying general and ocular aging. The prevention and treatment of chronic infection are also of importance in postponing the aging process. (14 illustrations, one color plate, extensive bibliography.)

John C. Long.

Hamilton, J. B. **Ocular complications in relapsing fever.** Brit. Jour. Ophth., 1943, v. 27, Feb., pp. 68-80. (See Section 7, Uveal tract, sympathetic disease, and aqueous humor.)

Johnson, R. H., Harley, R. D., and Horton, B. T. **Arteritis of the temporal vessels associated with loss of vision.** Amer. Jour. Ophth., 1943, v. 26, Feb., pp. 147-151. (References.)

Julianelle, L. A., and Moore, E. **Pathological changes in listerella infection, particularly of the eye.** Amer. Jour. Path., 1942, v. 18, Sept., p. 813. (See Section 5, Conjunctiva.)

Koch, F. L. P., Wolf, A., Cowen, D., and Paige, B. H. **Toxoplasmic encephalomyelitis. 7. Significance of ocular lesions in the diagnosis of infantile or congenital toxoplasmosis.** Arch. of Ophth., 1943, v. 29, Jan., pp. 1-26.

Human toxoplasmosis, a protozoal infection, was first encountered as a severe disseminated encephalomyelitis in infants, after which it was observed in older children as a milder form of encephalitis and in adults as a generalized infection with pulmonary involvement. The large reservoir of spontaneous toxoplasmic infection in rodents and in birds is the most likely source of the human infection; however, no definite evidence of the mode of transmission from the lower animals to man is available. The frequent occurrence of lesions in the eyes and the fetal inception of infantile cases through the placenta have been stressed in a previous paper.

The first six cases clinically diagnosed are reported in detail and three more in summary. The pathologic observations are described and it is noted that necroticizing and inflammatory lesions in the retina and choroid are similar to those found in the brain. Associated congenital ocular abnormalities, such as microphthalmos, severe anisometropia and optic atrophy, are recorded. Some of the diagnostic ophthalmoscopic features are: (1) extensive focal lesions in infants and children; (2) regularity of bilateral involvement of the macular region; (3) punched-out appearance in the late phase; (4) occurrence of massive chorioretinal degeneration, extensive connective tissue proliferation, and heavy pigmentation, as contrasted with the dissociation of these changes in other chorioretinal lesions; (5) presence of an essentially normal retina and vasculature around the lesions in all stages of the infection; (6) tendency

to occurrence of associated congenital defects; (7) rapid development of sequential optic-nerve atrophy; and (8) constant clarity of the media in the presence of severe chorioretinitis.

The authors differentiate toxoplasmic chorioretinitis from pseudoglioma; intraocular tumors; traumatic lesions, particularly the intraocular sequelae of injury at birth; hereditary cerebromacular degeneration; congenital developmental defects; and other less frequent lesions. The condition should be regularly considered in infants and children with a history of convulsion, hydrocephalus, mental retardation, speech difficulties, defective vision, or intracerebral calcification first observed in early infancy. (10 illustrations, including 3 color plates; references.)

Ralph W. Danielson.

Leinfelder, P. J., and Paul, W. D. **Papilledema in general disease.** Arch. of Ophth., 1942, v. 28, Dec., pp. 983-988. (See Section 11, Optic nerve and toxic amblyopias.)

Obregón Oliva, R., Caeiro, A., and Ferreyra Videla, I. **Roentgenologic types of pulmonary involvement in ocular tuberculosis.** Arch. de Oft. de Buenos Aires, 1941, v. 16, Nov., p. 630.

The authors have investigated clinically and roentgenologically the pulmonary status in a series of 94 cases of confirmed tuberculosis of the eye. They found that the number of patients with negative chest findings was small, comprising only 15.5 percent of the cases.

X-ray evidence of both primary infection and re-infection was found and while the former type was more prevalent it was apparently unrelated to the clinical form of ocular tuberculosis encountered. Retinal periphlebitis was accompanied in 36.2 percent of the cases by active pulmonary lesions, usually of re-infection type, while phlyctenular keratoconjunctivitis was more frequently associated with the active pulmonary lesions of primary infection. Keratitis, scleritis, and uveitis are less frequently accompanied by active pulmonary involvement.

Plinio Montalván.

Ortin, Leoz. **Ocular phenomena of starvation.** Arch. de la Soc. Oft. Hispano-Americana, 1942, no. 1. (Received in reprint from author.)

This record is based upon five hundred cases of eye disease from undernutrition, observed in Madrid during the Spanish civil war.

Most of the cases presented characteristic fundus lesions. The subjective symptoms were dominated by reduction in vision sometimes slow and progressive, at other times rapid and fulminating, but rarely amounting to complete loss of vision. The patients complained of obscured vision, without contrasts or colors, often with dazzling. Other patients recorded seeing the words incompletely, lacking one or two letters. Others saw the letters oscillating or notched.

Fifty percent of the patients had scotomas, usually central and of less than ten degrees, sometimes paracentral, sometimes disseminated. Reduction in the peripheral field of vision was not frequent. Colors were generally distinguished but obscure. Sometimes a record was made of dyschromatopsia with inversion of the order of perception in the visual field. Hemeralopia was rare, nyctalopia more common.

The most frequent external manifestations were of an eczematous character: blepharitis, conjunctivitis, keratoconjunctivitis with scanty secretion but

with marked hyperemia and itching, sometimes accompanied by pain.

The fundus lesions belonged to the three following types: hyperemic, edematous, and mixed. The hyperemic type was the least frequent, being observed in about 15 percent of the cases. The optic disc was red, the retina congested, sometimes with slight edema, in other cases with punctate or linear hemorrhages. The edematous type occurred in 25 percent of the cases. The disc and the retina appeared more or less hazy and edematous, ranging from an opalescent appearance with slight infiltrations to retinas thick and opalescent like a thin layer of celloidin. In other cases the retina had a fatty aspect, with thin arteries and dilated veins, giving a degenerative and cadaveric appearance. The most frequent type was the mixed, including 40 percent of the cases. In this were combined the edematous symptoms already described, with hyperemia and hemorrhages. The visual acuity was sometimes normal, but generally diminished, being sometimes as low as one fiftieth.

In serious cases of malnutrition, the optic discs appeared atrophic, especially in the temporal half, with the margins sharply defined. Therapy, useful in early or moderate cases, was almost without effect in the advanced cases, even after the patient had been placed on a normal diet; the visual acuity remaining very low if the lesions were advanced.

The principal general symptoms, in addition to loss of weight which sometimes amounted to sixty pounds or more, were asthenia, an icy coldness in the extremities, paresthesias multiple and painful and accentuated by the warmth of the bed, great loss of memory, irritability, and cutaneous manifestations including pellagrous, pellagroid, petechias, purpuras, and scorbutic stomatitis. W. H. Crisp.

Pisetsky, J. E., and Kozzin, P. J. **Total alopecia associated with ocular disorders.** Amer. Jour. Dis. of Children, 1942, v. 64, July, pp. 80-86.

A ten-year-old daughter of a luetic father showed a completely bald scalp with the skin over it thinner than normal, eyebrows almost entirely absent, and eyelashes short and scanty. The vision of her right eye was 20/20 with correction and the vision of the left eye 5/200 uncorrectable. The left eye showed a converging strabismus, and around the macula a patch of atrophic retinochoroiditis covered by a scattered accumulation of blue-green pigment. There was also a secondary atrophy of the temporal side of the optic disc with contraction of the corresponding nasal visual field. A detailed report is given of the general examination, which was negative, and of the laboratory researches including spinal and provocative blood Wassermann, which were also negative. The authors mention the cases reported in the literature, with the different agents that appear to play a leading etiologic role. These include defective endocrine system, glioma of the brain, syphilis, pituitary disturbances, hypothyroid and hyperthyroid states, encephalitis, and head injuries, but the evidence adduced as to their causal relationship appears to be inconclusive. The presence of a central retinochoroiditis does not help in clearing up the etiologic factor in the present case, as myopia, anemia, lues, and tuberculosis, the usual causes of this fundus lesion, were absent. The authors conclude that the bodily changes and all other elements that appear in the history and study of this

case do not point to a luetic etiology, although the father was luetic at the time of the patient's conception. This case confirms the general experience that alopecia is obscure in origin and its association with eye lesions rare. (Bibliography, 3 figures.)

Melchiore Lombardo.

Thygeson, Phillips. **Viruses and virus diseases of eye. 1. Properties and nature of viruses.** Arch. of Ophth., 1943, v. 29, Feb., pp. 285-300.

The term virus has been limited to a group of disease agents of extremely small size. Their size is near or below the limit of visibility of the ordinary compound microscope. They are usually able to pass through filters which retain ordinary bacteria. Apart from the animal or plant body, viruses can be cultivated only in the presence of living cells. Most of the viruses produce cytoplasmic or nuclear inclusion bodies in susceptible cells.

The size of virus particles has been estimated by the use of colloidal filters with graduated pore diameter. Size has also been studied with ultraviolet microscopy, with the electron microscope, and with centrifugation analysis. The size of the particles varies from 250 millimicrons for the psitticosis virus to 10 millimicrons for the virus of foot and mouth disease.

Viruses will not multiply except in the presence of living cells. Many of them can be cultivated outside of the body in tissue culture. The cells of the chick embryo have been found especially useful for this purpose. Characteristically, virus disease results in the formation of cellular inclusion bodies in either the cytoplasm or the nucleus. Some of these inclusion bodies are sufficiently typical, for example, the Negri bodies of rabies, to be of importance in diagnosis. The inclusion bodies apparently consist of a matrix made up of a cellular-reaction product and the virus particle. Free virus particles known as elementary bodies may be seen in some virus infections. Some viruses, contrary to popular belief, may be seen with the oil immersion lens if suitably stained.

Viruses show rather definite tissue affinities, thus the viruses of wart, vaccinia, variola, varicella, and molluscum contagiosum attack the skin, whereas the viruses of rabies, poliomyelitis, Borna disease, and St.-Louis encephalitis show an affinity for the nervous system.

In addition to the formation of inclusion bodies, viruses may produce profound cellular changes. The virus of yellow fever produces rapid cellular death. Other viruses, as the Rous sarcoma virus, cause marked cellular proliferation. Considerable thought is being given to the possibility that viruses may cause some malignant growths of man.

Some of the virus diseases produce lasting immunity while others do not. Immunization may be produced against smallpox, rabies, and yellow fever by injection of attenuated virus. As yet no clear-cut effective serotherapy has been established for virus diseases, although convalescent serum is of great value in some.

Many viruses are extremely minute, smaller than some protein molecules. This and other properties have caused some observers to doubt that viruses are living organisms. The ability to multiply indicates that viruses are endowed with at least one of the fundamental properties of living matter. Viruses may perhaps be considered as minute bacteria that have become obligate parasites and have lost all life

processes except the power of reproduction and of toxin formation. (6 illustrations including one color plate, bibliography.) John C. Long.

Torres Estrada, A. **Possibility of observing with the ophthalmoscope microfilarias in the vitreous of patients affected by onchocercosis.** Ophth. Ibero-Amer., 1942, v. 4, no. 2, pp. 140-145 (in Spanish) and pp. 146-151 (in English).

The author has found it possible to observe microfilarias in the vitreous by direct ophthalmoscopy. The organisms seemed to be more numerous in the vitreous than in the anterior chamber. Their study with an ophthalmoscope is easier than with the biomicroscope, and it renders possible the finding of the parasite in patients who show no evidence of it in the anterior chamber and who present negative biopsies. The author states the examination to be so easy that it may be used by general practitioners and visiting nurses.

W. H. Crisp.

Woods, A. C., and Burky, E. L. **Experimental studies of ocular tuberculosis. 7. Effect of desensitization with tuberculin in experimental ocular tuberculosis.** Arch. of Ophth., 1943, v. 29, March, pp. 369-379. Also Trans, Amer. Ophth. Soc., 1942, v. 40.

In previous papers of this series experiments were reported which revealed the following facts: (1) When normal rabbits are systemically inoculated with virulent human tubercle bacilli, there results a self-limited low-grade tuberculosis which provides a relative resistance to reinfection and definite tissue hypersensitivity to tuberculin. In these immune-allergic rabbits the ocular sensitivity parallels the general cutaneous sensitivity. (2) When normal and immune-allergic rabbits are inoculated in the anterior chamber with tubercle bacilli or tuberculin, the degree of inflammation resulting parallels the degree of hypersensitivity to tuberculin present or developing in the inoculated eye. Thus, in a normal rabbit the reception of tubercle bacilli in the eye causes no immediate reaction. (3) The degree of hypersensitivity resulting from a prior systemic inoculation may vary in individual immune-allergic rabbits. (4) Finally, an experiment was made which demonstrates that when immune-allergic rabbits are desensitized with tuberculin prior to inoculation of the eye the incubation period for ocular disease is longer, the incidence of absolute immunity much higher, and the course of any subsequently developing ocular tuberculosis much milder than in non-desensitized rabbits similarly inoculated.

The next questions to be investigated on the action of tuberculin were: (1) Does tuberculin have any effect on ocular tuberculosis in immune-allergic rabbits when treatment is instituted after the ocular disease is already active? (2) If so, what is the mechanism of such therapeutic effect, a tissue desensitization or some other process? In order to attempt to answer these questions eighty normal rabbits were inoculated systemically with tubercle bacilli. Approximately three months later, when the animals had become immune-allergic, the right eye of each was inoculated in the anterior chamber with living tubercle bacilli. Approximately three weeks later, when tuberculous inflammation was present in varying degrees in all eighty rabbits, the degree of inflammation was estimated, and the rabbits were divided into two equal groups. One group was thereupon treated with old tuberculin

0.1 c.c., intracutaneously twice a week, and the treatment was continued for a period of six months.

As a result of these experiments the authors are able to answer the first question by stating that the treated group showed a prompt decline in the severity of the ocular lesions, the disease running a shorter and less severe course in this group than in the untreated group. As for the second question, there was definite evidence of desensitization to tuberculin in the treated group both during the course and at the end of the experiment. The clinical improvement in the eyes appeared synchronously with the evidence of desensitization. A study of the results of these tests indicates that desensitization was the cause of the clinical improvement. (3 tables, references.)

Ralph W. Danielson.

18

HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Contardo, R., Peralta, A., Arentsen, J., and Gonzalez, F. **Errors of refraction in school children.** Rev. Chilena de Higiene y Med. Preventiva, 1942, v. 5, June, pp. 13-16.

The statistics given are along familiar lines and are utilized to emphasize the importance of this sort of examination in the public schools.

Coston, T. O. **Causes of blindness in Oklahoma.** Jour. Oklahoma State Med. Assoc., 1942, v. 35, Nov., pp. 454.

Aid to the blind in Oklahoma has been functioning since 1937 and in that time 2,146 cases have been placed on the pension rolls. In addition to financial need, the corrected vision must be less than 20/200, unless the field is less than 20 degrees. Actually 65 percent of the group have less than 5/200. The principal causes of blindness in the total number are: trachoma 23.3 percent, cataract 18.1 percent, optic atrophy 14.8 percent, uveal disease 13.7 percent, keratitis 12.3 percent, and glaucoma 6.9 percent. There is no provision for medical or surgical care under the present program.

T. E. Sanders.

Gordon, B. L. **Ancient medical jurisprudence with reference to the eye.** Arch. of Ophth., 1942, v. 28, Nov., p. 860.

This article discusses medical jurisprudence as practiced in ancient Babylon, Persia, Egypt, China, Judea, India, Greece, and Rome, and in medieval Europe. (Bibliography.)

John C. Long.

Hayes, H. E. **The coördination of assistance and services for the blind in a state program.** Outlook for the Blind, 1942, v. 36, June, p. 134.

The author discusses how coördination for assistance to the blind may be made effective. The various steps taken to accomplish success in what he terms the Kansas plan are made the main part of this discussion. Such success is expected to be slow because of the magnitude of the educational process necessary to prepare the so-called "general" case worker for dealing with problems of ocular health and problems associated with blindness.

Francis M. Crage.

Icaza y Dublan, M. J. **The surgery of Castroviejo.** Bol. del Hosp. Oft. de Ntra. Sra. de la Luz., 1941, v. 1, pp. 261-264.

An extremely enthusiastic appraisal of Castroviejo's surgical technique as demonstrated in his cinematographic films and during a personal visit to Mexico.

Lancaster, W. B. **Terminology in ocular motility and allied subjects.** Amer. Jour. Ophth., 1943, v. 26, Feb., pp. 122-132.

Loewenstein, Arnold. **Ophthalmology as a task of social hygiene.** Reprint received from author, and marked "Czechoslovak Medical Bulletin no. 3."

The author, who writes in English and is now stationed at the Tennent Institute of Ophthalmology, University of Glasgow, Scotland, discusses the general subject of prophylaxis against blindness, under the following captions: hereditary diseases, with special reference to the giving of information to, or special requirements concerning, those who are planning to marry, and with incidental reference to sterilization of carefully selected individuals; venereal diseases; myopia; scrofulous diseases; injuries; trachoma; the special training of general practitioners and eye physicians. W. H. Crisp.

Piersol, G. M. **Medical considerations of some geriatric problems.** Arch. of Ophth., 1943, v. 29, Jan., pp. 26-35; also Trans. Sec. on Ophth., Amer. Med. Assoc., 1942, 93rd mtg.

The author discusses the noteworthy increase in life expectancy and the changing trend in the age composition of the population of this country. From the outbreak of the Revolutionary War until the turn of the nineteenth century, expectancy of life in this country increased only from 35 to 50 years, but by 1930 the expectancy for the white population was 60 years. By now it is three or four years longer, and in another 15 years it may reach 75 years. This has caused a shift in the age composition. In 1900, persons aged 45 years or more made up 17 percent of the population; in 1940, 26 percent; and by 1980 it is estimated that they will represent 40 percent. This shift is of importance not only medically but also sociologically, economically, and politically. The increase in life expectancy is related to achievements of preventive medicine. Older people should have opportunity to enjoy their added years in good health and contentment. The author quotes his own previous statement: "The society which fosters research to save human life cannot escape responsibility for the life thus extended." Physicians must learn to care for old people. The ophthalmologist should appreciate what is physiologically normal for an older person. An aged diabetic patient, for example, who has lived in a state of equilibrium with a blood-sugar level far in excess of normal may be suddenly thrown into cardiac failure as a result of drastic efforts to bring the blood-sugar level down to normal and to keep it there. (References.) Ralph W. Danielson.

Price, M. L. **Role of the medical social worker in an ophthalmologic service.** Arch. of Ophth., 1943, v. 29, Feb., pp. 266-272.

A medical social study was made of 599 patients entering the ophthalmologic clinic of the University of Pennsylvania. It was found that almost one half failed to profit fully from the services offered by the clinic. Although only 2 percent refused the medical recommendations, 48 percent failed to carry out the prescribed treatment. Among the commoner causes for lack of completion of treatment are fear of surgery and an incomplete understanding of the medical or surgical condition. The author recommends that the social worker have in the clinic an office where she will be readily available to the physician and patient. It is

also advisable for the worker to accompany physicians on regular ward rounds. A medical social worker's largest contribution depends upon her ability to understand the significance of illness to the patient and to help him to meet the emotional and social problems arising from the illness. (2 tables, references.) John C. Long.

Santa Cecilia, Prof. Arquivos do Inst. Penido Burnier, 1942, v. 6, July, pp. 277-280.

An obituary of this distinguished Brazilian ophthalmologist by A. de Almeida, with an introduction by Monteiro Sales. (See obituary by Martins, V. H., Amer. Jour. Ophth., 1943, v. 26, p. 339.) An excellent portrait of Santa Cecilia serves as frontispiece to this issue of the Arquivos do Instituto Penido Burnier. W. H. Crisp.

Sená, J. A. **Trachoma, its prophylaxis in the Argentine Republic.** La Semana Med., 1942, v. 49, Dec. 24, pp. 1520-1546.

This 26-page article, well illustrated by reproductions from various authorities on the subject, consists of lectures addressed to a medical audience in the advanced course of Hygiene and Social Medicine (Argentina). The author is head of the Trachoma Section of the Argentine National Department of Hygiene. The nature and treatment of trachoma are thoroughly reviewed in the light of modern knowledge, and special attention is devoted to prophylaxis, with the addition of statistics regarding the Argentine and the text of a law recently adopted by that country's Parliament.

W. H. Crisp.

Sugar, H. S. **Malingering in military ophthalmology.** Military Surg., 1942, v. 91, Sept., pp. 314-320. (See Section 1, General methods of diagnosis.)

Tiffin, J., and Kuhn, H. S. **Color discrimination in industry.** Arch. of Ophth., 1942, v. 28, Nov., pp. 851-857; also Trans. Sec. on Ophth., Amer. Med. Assoc., 1941, 93rd mtg.

Color discrimination tests were conducted on approximately 7,000 employees of a sheet and tin mill. Several different methods of testing were used, the details of which are not discussed. It was found that there were many degrees of the ability to discriminate color and that this ability decreased appreciably with advancing age. Only 55.3 percent of the employees passed the most difficult of the tests. It was noted that the more responsible jobs in the plant were held by workers having good color vision even though good color vision was not considered a necessity in their work. Since color vision deteriorates with age, the authors stress the importance of critically studying persons training for jobs which require good color discrimination. Color vision exists in varying degree in almost all people and is not an "all or none" quality. (3 charts.)

John C. Long.

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ANATOMY, EMBRYOLOGY, AND COMPARATIVE OPHTHALMOLOGY

Duggan, W. F. **Clinical vascular physiology of the eye.** Amer. Jour. Ophth., 1943, v. 26, April, pp. 354-368. (Bibliography.)

Jahn, T. L., and Wulff, V. J. **Allocation of electrical responses from the compound eye of grasshoppers.** Jour. Gen. Physiology, 1942, v. 26, Sept. 20, p. 75.

Two species of grasshoppers were used in the authors' experiments. Studies were made of electroretinograms in the normal animal and in others whose eyes had been deganglionated. Observations were made of the electrical oscillations and the morphology of the structures used in the experiments.

The conclusions drawn from the experiments described are: (1) that the optic ganglion is the site of the origin of electrical oscillations; (2) that the slow potential of the optic ganglion is a component of the electroretinogram of the grasshopper.

Francis M. Crage.

Wolff, Eugene. **The differential staining of the rods and cones.** Trans. Ophth. Soc. United Kingdom, 1941, v. 61, p. 81.

The author showed preparations and colored photomicrographs stained with Mallory's triple stain after fixation with Zenker's fluid. The cones were stained blue and the rods red.

Beulah Cushman.

NEWS ITEMS

Edited by DR. RALPH H. MILLER
803 Carew Tower, Cincinnati

News items should reach the editor by the twelfth of the month.

DEATHS

Dr. Thomas J. Harris, Tucson, Arizona, died March 14, 1943, aged 77 years.

Dr. Paul S. Wagner, Redwood City, California, died February 13, 1943, aged 58 years.

Dr. Addison A. Blassingame, Denison, Texas, died March 1, 1943, aged 68 years.

Dr. Sergius M. Ingerman, New York, New York, died February 18, 1943, aged 74 years.

Dr. Walter J. Sener, Media, Pennsylvania, died recently, aged 66 years.

Dr. Albert G. Aschauer, Springfield, Illinois, died March 6, 1943, aged 63 years.

Dr. Oscar M. Longenecker, Kansas City, Kansas, died February 26, 1943, aged 76 years.

Dr. Wesley H. Peck, Highland Park, Illinois, died February 26, 1943, aged 79 years.

Dr. Colvin C. Perdue, Mobile, Alabama, died February 4, 1943, aged 51 years.

Dr. Roscoe C. Tarbell, Groton, New York, died March 8, 1943, aged 67 years.

Dr. Joshua T. Ward, Laredo, Texas, died February 25, 1943, aged 69 years.

MISCELLANEOUS

The Manhattan Eye, Ear, and Throat Hospital, Department of Ophthalmology, in its weekly lecture series from April 23d to May 28th, presented the following program: "Diseases of the lacrimal sac and treatment," by Dr. Walter Hipp; "Office practice in ophthalmology," by Dr. Guernsey Frey; "Ten-year end results in two hundred cases of intracranial tumor," by Dr. Thomas I. Hoen; "Exophthalmos," by Dr. Murray A. Last; and "Plastic reconstruction following injuries of the eyelids," by Dr. Daniel Kirby.

The next examination by the American Orthoptic Council will be held in September-October, 1943.

The written examinations will be held at various cities in the country on September 9th. Only those passing the written examinations will be permitted to take the oral and practical tests, to be given in Chicago, October 9th.

Applications on official forms must be received before August 1, 1943.

Address the American Orthoptic Council, 23 East 79th Street, New York, New York.

Anent the recent editorial on Aldous Huxley and eye exercises (American Journal of Ophthalmology, 1943, volume 26, page 200), an interesting letter has been received from Mr. W. C. Souter, ophthalmic surgeon of Aberdeen, Scotland. Mr. Souter calls attention to the fact that one of the articles in George M. Gould's "Biographic clinics" dealt with Thomas Huxley, Aldous Huxley's grandfather. Thomas Huxley, the famous English scientist, was apparently a lifelong sufferer from dyspepsia and other disturbances which Gould interpreted as dependent upon uncorrected hyperopic astigmatism. Mr. Souter suggests that Gould's "article on the doubting Thomas may help to explain the genesis of some of the psychology of the grandson."

SOCIETIES

At the recent annual session of the Medical Association of the State of Alabama, at Birmingham, April 20th-22d, the president's message was given by Dr. H. B. Searcy of Tuscaloosa. Ophthalmology was further represented in the Section on Eye, Ear, Nose, and Throat by Dr. Phil Lewis, who read a paper on External diseases of the eye: with kodachrome slides, and by Dr. A. D. Ruedemann's motion-picture film on Cataract surgery.

The annual congress of the Ophthalmological Society of the United Kingdom was held in London, on April 30 and May 1, 1943. After the president's address of welcome, a discussion of "Thyrotoxicosis in its relation to ophthalmology" was opened by Dr. W. Russell Brain and Mr. L. H. Savin. This was followed by the presentation of papers: Dr. A. J. Ballantyne and Dr. A. Loewenstein, "The pathology of diabetic retinopathy"; Dr. D. V. Giri, "A rare combination of congenital ocular defects in a dwarf"; Mr. E. C. B. Hughes, "Selected cases illustrating the value of quantitative perimetry in neuro-surgical diagnosis"; Mr. F. A. Williamson-Noble and Mr. A. J. B. Goldsmith, "The effect of diathermy on a malignant melanoma of the choroid"; Major E. F. King, "Some observations on traumatic cataract." A joint clinical meeting with the Ophthalmological Section of the Royal Society of Medicine followed.

On the second day of the congress, a discussion of "The scientific and clinical aspects of night vision" was opened by Prof. W. J. B. Riddell and Air Commodore P. C. Livingston. The following papers were presented: Dr. Dorothy Campbell, "Hereditary microphthalmia in albino rats"; Mr. E. Wolff, "Ghost rings on

the internal limiting membrane of the retina"; Wing Commander Bromley and Wing Commander T. K. Lyle, "An apparatus for localizing foreign bodies in the orbit"; Dr. A. Loewenstein and Dr. A. Garrow, "A contribution to the anatomy of circinate retinopathy."

The Reading Eye, Ear, Nose, and Throat Society held an extended meeting on April 28, 1943. Dr. Wilfred E. Fry spoke on "Open-angle glaucoma"; Dr. Charles A. Rankin, on "Bifocals"; Dr. James A. Babbitt, on "Otolaryngologic forecast." Films were shown from Drs. Daniel B. Kirby and Lee M. Hurd, from the Cleveland Clinic, The Medical Film Guild, and from the Eastman Kodak Company. A "Summary of audiometric examination of Reading school children" was discussed; and a "Case of successful facial-nerve graft," and a "Case of intraocular tumor in a child five weeks of age" were presented.

At the one hundred and third annual meeting of the Illinois State Medical Society, May 18th-20th, the following papers were presented: "Epidemic conjunctivitis," by Major Murray Sanders (MC) A.U.S., and "Industrial ophthalmology and otolaryngology," by Dr. Gordon F. Harkness, Davenport, Iowa.

Among the guest speakers at the annual meeting of the Medical Society of the State of New York were Dr. Francis Heed Adler, Philadelphia, who spoke on "Gas injuries," and Dr. Harry S. Gradle, Chicago, who lectured on "Early recognition and management of glaucoma."

The West Virginia State Medical Association held its seventy-sixth annual meeting, May 16th-18th. Included in the program was a paper by Dr. Henry M. Goodyear, Cincinnati, on "Some practical considerations in the diagnosis and treatment of eye, ear, nose, and throat conditions of interest to the general practitioner."

Personals

Dr. William B. Clark, New Orleans, was among the speakers at the annual session of the Mississippi State Medical Association, May 12th-13th. The subject of his contribution was "Glaucoma."

Dr. William Banks Anderson, Durham, North Carolina, presented a paper, entitled "Unilateral exophthalmos as a diagnostic problem," at the ninetieth annual session of the Medical Society of the State of North Carolina, May 10th-12th.

Dr. Ramón Castroviejo, New York, read a paper entitled "Comments on ophthalmic surgery," at the annual meeting of the Connecticut State Medical Society, held May 25th-27th.

Major Murray Sanders (MC) A.U.S., was among the out-of-state speakers at the annual meeting of the Massachusetts Medical Society, May 24th-26th. The title of his address was "Epidemic keratoconjunctivitis."

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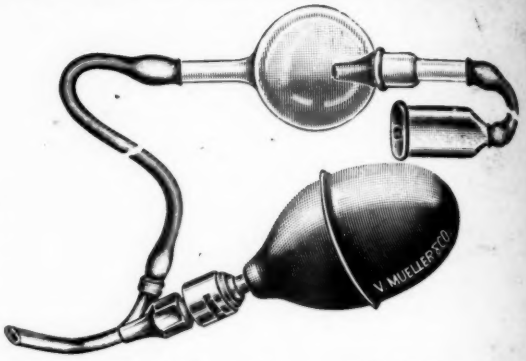

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REFERENCE: Archives of Ophthalmology, July, 1941, Vol. 26, pp. 127 and 128.

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